DOCUMENT RESUME

ED 065 317 SE 014 291

TITLE	Scientific and Technical Personnel in Industry, 1969.
INSTITUTION	Bureau of Labor Statistics (DOL), Washington, D.C.
REPORT NO	Bull-1723
PUB DATE	71
NOTE	41p.
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 ($0.45)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Bulletins; *Engineers; Industrial Personnel; *Industry; *Scientific Personnel; *Surveys; Technical Occupations

ABSTRACT

The survey, conducted by the Bureau of Labor Statistics, includes a brief summary of findings; survey methods; the questionnaire, reporting instructions, definitions used to collect data; and tables. It was estimated that 1,062,000 scientists and engineers were employed in private industry in 1969, up 3.9 percent from the 1,022,000 employed in 1968. These workers represented 3.0 percent of total private employment in 1969. Between 1968 and 1969, employment of scientists increased faster than the employment of engineers--4.6 percent compared with 3.8 percent. Among the scientific occupations, the greatest increase in employment was shown by mathematicians. Technician jobs rose by only 2.5 percent over the year. (CP)

ED 065317

Scientific and Technical Personnel in Industry, 1969

Bulletin 1723

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics
1971

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

LAG
SE

ED 065317

Scientific and Technical Personnel in Industry, 1969

Bulletin 1723

U.S. DEPARTMENT OF LABOR
J. D. Hodgson, Secretary

BUREAU OF LABOR STATISTICS
Geoffrey H. Moore, Commissioner

1971

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 45 cents

Preface

Results of a 1969 Survey of Scientific and Technical Personnel in Industry conducted by the Bureau of Labor Statistics are shown in the following manuscript. Included are a brief summary of findings; survey methods; the questionnaire, reporting instructions, and definitions used to collect data; and tables. The reference date of the survey is January 1969. For some series data are shown also for January 1968.

The Bureau wishes to express its appreciation to the many organizations and individuals whose cooperation made this survey possible.

3

Contents

		Page
I.	Highlights	1
II.	Survey methods	2
III.	Questionnaire, reporting instructions, and definitions	6
IV.	Statistical tables:	
	1. Employment of scientists, engineers, and technicians by industry, 1969	24
	2. Employment of scientists, engineers, and technicians by industry, 1968	24
	3. Employment of scientists and engineers, and technicians in research and development by industry, 1969	25
	4. Employment of scientists and engineers, and technicians in research and development by industry, 1968	26
	5. Employment of scientists by occupation and industry, 1969	27
	6. Employment of technicians by occupation and industry, 1969	28
	7. Employment of scientists and engineers in research and development by occupation and industry, 1969	29
	8. Employment of scientists and engineers, in Federal Government work, total, and in research and development by agency and industry, 1969	30
	9. Employment of engineers, in Federal Government work, total, and in research and development by agency and industry, 1969	31
	19. Employment of scientists in Federal Government work, total, and in reseach and development by agency and industry, 1969	32
	11. Employment of scientists and engineers in Federal Government work, total, and in research and development, all agencies by industry, 1968	33
	12. Employment of scientists and engineers in industry, and in research and development work within industry, distributed by State, 1969	34
	13. Employment of scientists and engineers, and technicians, and percent receiving in-house training in science and technology by industry, 1969	35

Highlights

An estimated 1,062,000 scientists and engineers were employed in private industry in 1969, up to 3.9 percent from the 1,022,000 employed in 1968, according to a Bureau of Labor Statistics survey. These workers represented 3.0 percent of total private employment in 1969, the same percent as in most years since 1963.

Between 1968 and 1969, employment of scientists increased faster than the employment of engineers—4.6 percent compared with 3.8 percent. Among the scientific occupations, the greatest increase in employment was shown by mathematicians, up 6.8 percent. Technicians jobs rose by only 2.5 percent over the year. The growth in specific technician occupations, however, was uneven. Employment of surveyors, for example, increased by over 9 percent; draftsmen showed an increase of 1.2 percent. The increased employment of surveyors reflects primarily a strong upturn in the contract construction industry.

Approximately 7 out of 10 sceintists and engineers in private industry were in manufacturing. Engineers outnumbered scientists by about 4 to 1. Over half of all scientists and engineers in private industry were employed in only six manufacturing industries—electrical equipment, chemicals, aircraft and parts, machinery, ordnance, and instruments.

Employment of scientists and engineers in nonmanufacturing industries increased by over 8 percent between 1968 and 1969. The number of scientists and engineers in contract construction increased by more than 10 percent, and employment in industries closely related to construction also showed strong increases in scientific and technical employment. In engineering and architectural services, for example, employment of scientists and engineers increased by nearly 7 percent.

The number of scientists and engineers in manufacturing industries increased slowly, only about 2 percent, because of slowdowns in defense-related employment. For example, scientific and engineering personnel in the ordnance industry grew by less than 1 percent; in aircraft and parts and communications equipment, employment of scientists and engineers declined 1.8 and 3.0 percent, respectively. This decline was in contrast to earlier years. For example, employment of scientists and engineers in aircraft and parts increased by 12 percent between 1966 and 1967 and by about 7 percent between 1967 and 1968. Technician employment also declined in defense-related industries in 1969. Employment of these workers was down 4.7 percent in ordnance, almost 2 percent in communications equipment, and 5 percent in aircraft and parts.

The number of scientists and engineers in research and development (R&D) increased by about 1 percent between 1968 and 1969. As a part of total scientists and engineer employment, however, R&D scientists and engineers dropped by about 1 percent—from 37.7 in 1968 to 36.7 in 1969, in part as a result of reduced government expenditures for research and development.

Approximately 280,000 scientists and engineers in private industry, or over 26 percent, were employed on Federal Government work in 1969, about 3 percent more than the estimated 273,000 employed in 1968. About 55 percent of those employed on Federal Government work were in R&D. Almost 200,000 were engaged in work for the Department of Defense and another 40,000 for the National Aeronautics and Space Administration.

Although scientists and engineers were employed in every State in 1969, more than 3 out of 10 were in California, New York, and Ohio. The largest number of engineers were employed in California, and the largest number of scientists were in New York.

Survey Methods

This appendix contains a brief discussion of coverage and conduct of the survey, nature of the estimates, problems of definition and classification of data, and comparability of the 1969 survey with earlier surveys.

Scope of the survey

The basic sample in the survey was drawn from establishments reporting to State employment security agencies for unemployment compensation (first quarter of 1964 and 1965). This list was supplemented by a list of railroads and related companies. (Except in Hawaii and Alaska, most railroads are interstate and are not included in the State UI statistics.) These combined lists included approximately 2,300,000 organizations with around 45 million employees and comprise the most comprehensive and readily accessible roster of establishments available in the United States. The sample was further supplemented by a list of establishments which had reported an exceptionally high proportion of scientists and engineers in the 1966, 1965, and 1964 surveys. This group of reporting units included a large number of establishments selected in earlier samples as supplemental members.[1] Most of these establishments were independent research and development laboratories which work under contract. The ratio of scientists and engineers to total employment in these units was, on the average, 50 percent higher than the overall average for industry. Although no special recognition was made for technicians in the supplemental listing, they were considered in the general design of the sample. For example, medical and dental laboratories which have a high representation of technicians were covered extensively in the survey—all size groups were represented and there was no cutoff.

Certain categories of establishments were eliminated from the master list before the sample was selected, either because a separate survey of the given category was being sponsored by the National Science Foundation or because the number of scientific and technical personnel employed was believed to be negligible. The categories or organizations omitted were those classified according to the standard industrial classification system[2] in the following major industry groups: 01 and 02–farms; 071–agricultural services, except animal husbandry and horticultural services; 55–automotive dealers and gasoline service stations; 56–apparel and accessory stores; 57–furniture and home equipment; 80–medical and other health services (except 807, medical and dental laboratories, which was included); 82–educational services; 84–museums, art galleries, and botanical and zoological gardens; 86–nonprofit membership organizations; 88–private households; 89–miscellaneous services (except 891, engineering and architectural services, which was included); 91 through 94–government; and 99–nonclassifiable establishments.

Establishments below a specified minimum size, determined separately for each major industry group, also were excluded from the sample, because it was found that very few scientists, engineers, or technicians are employed in most small sized establishments. These minimum-size cutoffs were essential to the efficiency of the survey. Altogether, 1.8 million establishments employing nearly 11 million workers were excluded from the original lists of establishments. Since the unemployment insurance (UI) listing of establishments from which the sample was drawn was complied as of March 1964 and 1965, the survey also did not reach establishments created after those dates. However, this exclusion does not necessarily mean an understatement, since current employment figures are used as the basis of the estimate to which are applied the proportionate ratios of scientists and engineers.

As a result of the exclusions described above, a sampling universe of about 530,000 establishments employing around 33 million workers remained. Before the sample was drawn, the universe listing was stratified by State, region, industry, and size of establishment.

Sample design

The survey sample consists of three major segments: The probability segment, supplementals, and multiestablishment reporters. The probability segment comprised

[1] The 1961-64 sample contained a supplemental group of about 800 research and development laboratories drawn originally from the 11th edition of *Industrial Research Laboratories of the United States, 1960* No. 844 (National Research Council), and *A List of Small Business Concerns Interested in Performing Research and Development, June 1960* (U.S. Department of Commerce, Small Business Administration).

[2] All industrial classification for this survey was in terms of the 1957 Standard Industrial Classification Manual. See *Standard Industrial Classification Manual, 1957* and the *1963 Supplement.* Executive Office of the President, Office of Management and Budget.

nearly 25,000 establishments in the 1969 survey, selected at random from the March 1964 and 1965 State UI lists. Supplementals, including railroads and selected establishments known to employ large numbers of scientists and engineers, raised this total to slightly over 27,000 establishments. About 1,200 of these establishments were known to be incorporated into about 300 companies that report on a multiestablishment basis, either company- or industrywide or on a divisional or regional basis. In addition to the 1,200 establishments drawn in the probability sample, the reports from these 300 companies covered about 10,000 units not in the sample.

The sampling ratio in the probability segment was varied in relation to size of establishment and other factors to obtain maximum reliability with resources available. In every covered industry, all establishments having 1,000 employees or more were included in the sample. In other industry-size cells, the sampling ratios ranged from 1 in 1 to 1 in 100. In general, the larger the establishment and the greater the number of technical personnel used by the industry, the higher was the sampling ratio. This procedure varied for the supplementals. Although the railroads were reported on a company rather than establishment basis, they were handled the same as the probability segment with certainty cases of 1,000 or more and a cutoff (50) for the smaller size groups. In contrast, all establishments on the supplemental list of high scientist- and engineer-users were included with a weight of unity and added to their appropriate industry-size class, regardless of the sampling ratio used in the UI sample for that particular industry-size class; and if the supplemental establishment duplicated a UI sample unit, it was treated as a supplemental unit with a weight of unity. The sample was designed to obtain satisfactory estimates of total scientists and engineers and of technicians in as much industry detail as possible from a sample of this size and, in addition, to obtain State estimates for as many States as practical. This necessitated different sampling ratios in the same industry-size group for different States.

Definitions used

The definitions used in the 1969 survey were the same as those used in previous surveys. These definitions were developed originally in consultation with industry representatives and others having knowledge of the field. The objective was to describe clearly the desired information and also to conform, insofar as possible, to customary personnel accounting practices. It was recognized that wide differences in organization and personnel records among industries, as well as among establishments in the same industry, would make inevitable some variation interpretation and application of the definitions.

The definition of the term "technician" was especially subject to variations in interpretation. There is, as yet, no general agreement as to the meaning of this term, which covers positions with a variety of job tities that differ among establishments. Consequently, the categories of personnel included in the figures reported for this item probably contain a higher order of response variation than do any of the other occupational categories contained in this bulletin.

A definition of the desired reporting unit also was provided. This definition was based, by necessity, on that used by the UI agencies in the listing of establishments from which the sample was drawn. [3] Separate information was requested for each establishment. Since it was known that some multiestablishment companies might find it difficult to supply the requested information for each separate establishment, it was stated on the questionnaire that if necessary, data might, be submitted on a multiestablishment basis. In 1969, this alternative procedure was followed by about 300 companies with over 10,000 establishments. It also was noted on the questionnaire that multi-industry companies might submit separate reports among corporate industrial division lines or on another comparable basis, since this method, from an industry survey viewpoint, is generally preferable to a single multiestablishment company report. About half of the multiestablishment reporters chose to report according to this option.

Conduct of the survey

The questionnaire for the 1969 survey, reproduced in appendix III was substantially the same as that used in previous surveys.

The questionnaires were mailed in May 1969, in most instances directly to the establishments. There were two full scale mail followups; the first was a simple reminder letter to the entire mailing list, and the second was a complete followup of all outstanding respondents. A third followup by mail, telephone, or field visit was made of selected critical nonrespondents that were essential to obtain meaningful data on a State level.

Each questionnaire was screened before it was accepted. Screening was designed to insure that each report was arithmetically consistent with the various items, subtotals, and totals reported; that it was properly classified by industry and size class; and that it represented the specific establishment drawn for the sample

[3] UI reporting procedures permit establishments reports for units that may be statewide or countrywide in scope or less than plantwide (e.g., all of a corporation's insurance agents in a given State cited as a separate establishment).

7

rather than multiestablishment report of either a single or multi-industry type. Each questionable item was researched to the fullest extent possible, including contact with the respondent, to determine what sort of correction to the originally submitted data was needed. Approximately 25 percent of all questionnaires required some form of correction adjustment.

The industrial classifications of the establishment in the survey were, in general, those assigned by the State employment security agencies, which developed the lists from which the sample was drawn. The industry classification for each establishment in the probability segment of the sample was determined by each State agency on the basis of the establishment's principal product. The industry code originally assigned to an establishment was changed in relatively few cases. When a multiestablishment return was received, the employment data for the return were distributed by occupation, industry, and size according to product or service information furnished by each respondent.

Comparability with previous surveys

The 1969 survey is basically comparable to other STP surveys. The same sample of establishments, identical questionnaires, and definitions were used. However, certain factors can affect comparability to some degree. Even though response rates may be similar, for example, the data received from the same establishment responding in two different years may indicate a difference in the interpretation of the definitions. Despite these variations, the total effect on year-to-year comparability is small, except for items where very small numbers were involved.

The estimating and processing procedures between 1969 and earlier surveys were unchanged.

Estimating methods

Estimating procedures used in this survey apply individually to each of the covered occupations. The group totals, such as life scientists, physical scientists, and total scientists and engineers, are summed from the estimates of the individual occupations comprising them. Estimates are obtained for each industry-size cell as a result of applying, to the total employment of the corresponding universe cell, the ratio of the sum of weighted employment in each occupation to the sum of weighted total employment derived from sample respondents.

The procedures used for the probability cells and the supplemental cells are necessarily treated in some what different ways. The methods are described below. The symbols used in the estimating equations were as follows:

M= total universe employment (derived from BLS employment estimates and a special tabulation of employment reported in the UI program), as of January of each related year.

e_{1i}= total employment reported by the i-th establishment in the probability sample.

e_{2i}= total employment reported by the i-th establishment in the supplemental sample.

e_{3i}= total employment distributed by estimating cell, as reported by the i-th consolidated reporter (both multi- and single-industry types).

B_o= total employment of the supplemental units at the time the selection was made (January 1963).

B_1= corresponding total employment of all responding supplement units (January 1963).

w_i= the sampling ratio reciprocal of units selected in the probability sample.

P_{1i}= item of estimate reported by the i-th establishment of the probability sample.

P_{2i}= item of estimate reported by the i-th establishment in the supplemental sample.

P_{3i}= distributed item of estimate imputed from the i-th unit of a consolidated reported (both multi- and single-industry types).

Since all estimates are calculated separately for each stratum, no notation representing industry or size is used.

The estimate (P'_1), such as the number of engineers performing research and development, was calculated for establishments tabulated in the probability sample as:

$$P'_1 = M' \left(\frac{\Sigma p_{1i} w_i}{\Sigma e_{1i} w_i} \right), \text{ where}$$

$$M' = M - (E'_2 + \Sigma e_{3i}) \text{ and}$$

$$E'_2 = \Sigma e_{2i} \left(\frac{B_o}{B_1} \right)$$

Estimates of all functions in each occupation were obtained by summation. The estimate for establishments drawn in the supplemental sample was calculated as:

$$P'_2 = \Sigma p_{2i} \left(\frac{B_o}{B_1}\right)$$

The estimate for each industry-size stratum was calculated as:

$$P' = P'_1 + P'_2 + \Sigma P_{3i}$$

Returns from multiestablishment reporters are only for the units covered and are not used as a basis for estimating total of other units, such as nonrespondents. Thus, the total from these multiestablishment reports are not subject to sampling errors as such. However, since reports of this type frequently cover units in two industries or more, it is necessary to distribute occupational employment among these industries. The method of distribution is the same for each occupation and can be illustrated by the following example:

Company X reports a total of 1,500 employees, 1,000 in cell Pa and 500 in cell Pb. In addition it reports a total of T engineers but does not indicate how many are in each of the two cells. In brief, the procedure used to estimate the distribution by cell was: A preliminary estimate was first made for each cell by applying the cell ratio of engineers to total employment (in the probability segment of the cell) to the reported employment by Company X in that cell. These preliminary estimated were proportionately adjusted to the reported total number of engineers for the company. This is expressed in symbolic terms as follows:

	Cell P_a	Cell P_b
Given Engineers in probability segment	$\Sigma(P_{ai}\, w_{ai})$	$\Sigma(P_{bi}\, w_{bi})$
Reported employment in probability segment	$\Sigma(e_{ai}\, w_{ai})$	$\Sigma(e_{bi}\, w_{bi})$
Reported company X employment	1000	500

Then

$$P'_a = \frac{1000\ \Sigma(P_{ai}\, w_{ai})}{\Sigma(e_{ai}\, w_{ai})} \qquad P'_b = \frac{500\ \Sigma(P_{bi}\, w_{bi})}{\Sigma(e_{bi}\, w_{bi})}$$

$$P_{3a} = \frac{P'_a}{P'_a + P'_b} \cdot T \qquad P_{3b} = \frac{P'_b}{P'_a + P'_b} \cdot T$$

where P_{3a}= estimated engineers for company X in cell P_a and P_{3b}= estimated engineers for company X in cell P_b.

II. Questionnaire, reporting instructions and definitions

BLS 2716A

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Budget Bureau No. 44-R1157
Approval expires March 1970

Information supplied on this form will be seen only by sworn employees of the Bureau of Labor Statistics. Only statistical summaries that preserve the confidentiality of the data supplied will be released.

← Information reported should cover all establishments in the location designated to the left.

(Change if incorrect, include ZIP code.)

Survey of Scientific and Technical Personnel in Industry, 1969

Gentlemen:
The Bureau of Labor Statistics is again conducting its annual Survey of Scientific and Technical Personnel in Industry. The results, which provide current nationwide information on scientific and technical manpower resources, serve as a guide in developing programs to strengthen the country's scientific potential.

To minimize costs, establishments are selected on a sample basis to represent small and large establishments in all types of industries, regardless of whether scientific and technical personnel are employed. Consequently, it is important to complete the report only for the unit(s) identified on the address label, even if scientific and technical personnel are not employed at that location. Reporting instructions and occupational definitions are provided in the enclosed booklet.

If you have any problems in reporting data for the establishment(s) specified, or questions concerning unit identification, or on any other aspect of the survey, please use the Letter Saver on the back page of the questionnaire. If you prefer to talk directly with a member of our staff, telephone collect: Area code 202-961-2477.

Please complete the questionnaire and return it to us within 3 weeks in the enclosed addressed envelope which requires no postage. Your cooperation in making this survey a success will be genuinely appreciated.

Sincerely yours,
Geoffrey H. Moore
Commissioner

Person to be contacted if questions arise concerning this report:

Name and title (please print or type) _____ Area code, phone no.

Street, city, State, and ZIP code

(Please complete items 1.10 and 1.20 even if you do not employ scientific or technical personnel.)

1.10 Employment

How many employees were on the payroll in the establishment(s) identified above for the period which included January 12, 1969, and 1968, respectively? Report all employees in addition to those in the occupations covered by the survey (e.g., all full- or part-time—salaried, or hourly paid employees in production, maintenance, office, administrative, sales, and managerial jobs).

Total employed in January of—	
1969	1968

1.20 Nature of Business

1. Enter the principal type of activity of this establishment (e.g., manufacturing, wholesale trade, retail trade, construction, public utility, research laboratory, etc.).

_____

2. Enter in order of importance the principal products manufactured, lines of trade, specific services, or other activities (e.g., electric fuses, gas meters, engineering services, etc.).

	Percent of total annual sales value or receipts, 1968
a. _____	_____
b. _____	_____
c. _____	_____
d. _____	_____

3. If manufacturing, please indicate:

a. Principal materials used (e.g., aluminum castings, machined parts, assembled parts; rayon staple, wool yarn, cotton fabrics, etc.—in the form brought into plant; do not list materials produced in this plant.).

_____

_____

b. What are the general types of operations performed (e.g., foundry, machine shop, assembly; spinning, weaving, sewing, etc.).

_____

_____

Please complete items 2-A, B, C; 3; and 4 on pages 2 and 3. If, however, none of your employees are in the occupations listed, check the blocks provided at the beginning of each of these items and return the form.

For BLS Use Only

Batch no.	

GENERAL INSTRUCTIONS

Employment data in the establishment(s) identified on the address label should relate to the pay periods which include January 12, 1969, and 1968, respectively. Include employees who are on paid vacations or sick leave during these periods. This survey covers both full- and part-time employees. Exclude consultants paid by another company, as well as pensioners, and members of the Armed Forces carried on the rolls, but not working during the period covered.

The number of employees should be reported for each occupation covered by the survey. Classify each employee in the occupational category in which he spends most of his time in accordance with the definitions found in section 2 of the Detailed Reporting Instructions. For example, an Organic Chemist in charge of a particular phase of production, and who works primarily as a Chemist, should be reported as a Chemist in item 2.31.

Personnel reported for occupations in items 2.00 through 2.49 and 4.00 under column (a), who in January 1969 were primarily engaged in research and development activities, should also be reported separately in column (b).

Detailed reporting instructions on methods of reporting, occupational descriptions, and definitions of terms are provided in the enclosed booklet. Please read the "Detailed Reporting Instructions" carefully before completing the questionnaire.

2A. Engineers, Mathematicians, and Natural Scientists (If none are employed check here.) 1969 ☐ 1968 ☐

Item and occupation	Total employed in January 1969		Total employed in January 1968
	All employees (a)	Number performing or managing research and development activities (b)	(c)
2.00 Total Engineers, Mathematicians, Physical Scientists, and Life Scientists			
2.10 Total Engineers			
2.20 Total Mathematicians			
2.30 Total Physical Scientists			
2.31 Chemists			
2.32 Physicists			
2.33 Metallurgists			
2.34 Geologists and Geophysicists			
2.39 Other Physical Scientists			
2.40 Total Life Scientists			
2.41 Medical Scientists (exclude practitioners)			
2.42 Agricultural Scientists			
2.43 Biological Scientists			
2.49 Other Life Scientists			

Summation instructions: Item 2.00 = the sum of 2.10 + 2.20 + 2.30 + 2.40;
item 2.30 = the sum of 2.31 through 2.39;
item 2.40 = the sum to 2.41 through 2.49.
Column (b) cannot exceed column (a).

2B. In-House Training in Science and Technology

(See section 5 of the Detailed Reporting Instructions for further explanation.)

Please check (✓) whether the establishment covered by this report currently conducts or engages in any formal in-house training programs in the form of: Instruction, courses, seminars, lectures, etc., covering science and technology subject matter for:

2.51 Engineers and natural scientists listed in item 2A, column (a) ---------- Yes ☐ No ☐

2.52 Nonprofessional technical personnel listed in item 4, column (a) ---------- Yes ☐ No ☐

2C. Engineers, Mathematicians, and Natural Scientists Engaged in Federal Government Work

Please check (✓) whether any of the Engineers, Mathematicians, or Scientists reported in item 2A, columns (a) and (c), were employed on Federal Government work in January 1969 or January 1968? If answer is "Yes" please complete items 2.70 through 2.91.

2.61 As of January 1969 Yes ☐ No ☐ 2.62 As of January 1968 Yes ☐ No ☐

NOTE: For this survey the production of standard items (e.g., shelf or vendor items) for the Federal Government is not considered work performed for the Federal Government. See section 3 of the Detailed Reporting Instructions for further explanation.

Item and occupation	Total employed in January 1969				Total employed in January 1968, all Federal agencies
	All Federal agencies (a)	Department of Defense (b)	National Aeronautics and Space Administration (c)	Other Federal agencies (d)	(e)
2.70 Total Engineers, Mathematicians, Physical Scientists and Life Scientists					
2.80 Total Engineers					
2.81 Engineers primarily engaged in performing or managing research-development					
2.90 Total Mathematicians, Physical or Life Scientists					
2.91 Mathematicians, Physical or Life Scientists primarily engaged in performing or managing research-development					

Summation instructions: Item 2.81 cannot exceed 2.80 and item 2.91 cannot exceed 2.90.
Vertically, item 2.70 = the sum of 2.80 + 2.90.
Column (a) = the sum of columns (b) + (c) + (d).
Number of employees reported in the occupations listed in item 2C cannot exceed those in item 2A.

3. Economists, Statisticians, and Psychologists (If none are employed, check here.) 1969 ☐ 1968 ☐

Item and occupation	Total employed in January	
	1969 (a)	1968 (b)
3.00 Total Economists, Statisticians, and Psychologists		
3.10 Economists		
3.20 Statisticians		
3.30 Psychologists		

Summation instructions: Vertically, item 3.00 = the sum of items 3.10 through 3.30.

4. Draftsmen, Surveyors, and Technicians (If none are employed, check here.) 1969 ☐ 1968 ☐

Item and occupation	Total employed in January 1969		Total employed in January 1968
	All employees (a)	Number performing or managing research and development activities (b)	(c)
4.00 Total, all occupations listed below			
4.10 Draftsmen			
4.20 Surveyors			
4.30 Electrical and Electronic Technicians			
4.40 Other Engineering and Physical Science Technicians			
4.50 Biological and Agricultural Technicians			
4.60 Medical and Dental Technicians			
4.90 Other Technicians			

Summation instructions: Vertically, item 4.00 = the sum of items 4.10 through 4.90.
Column (b) cannot exceed column (a).

LETTER SAVER

Gentlemen:

I cannot complete the questionnaire in accordance with your instructions for the following reason(s). (Check appropriate block(s) and identify person to be contacted on page 1 of the questionnaire.)

☐ 1. Employment data for scientific and technical personnel are not available separately for the establishment(s) identified on the address label but can be reported together with other establishments of our company.

☐ 2. Please return this questionnaire and send us _____ additional copies of BLS Form 2716A.

☐ 3. We cannot file a report for the establishment(s) identified on the address label for the following reason:

☐ a. The unit identified on the address label has been combined with the following subdivision of our company:

_____

and no longer exists as a separate organizational entity.

☐ b. The unit identified on the address label was temporarily inactive and had no employment as of January 12,

☐ 1969 ☐ 1968

☐ c. The unit identified on the address label was not in business on January 12,

☐ 1969 ☐ 1968

☐ d. The unit identified on the address label has been sold or is no longer part of our company. The new owner is:

_____
(name)

_____
(address)

☐ e. Other (specify)_____

_____

☐ 4. I will need assistance to complete your survey questionnaire.

REMARKS _____

_____

_____

☐ 5. Check if you desire a copy of our report, Scientific and Technical Personnel in Industry, 1961–66.

FOR BLS USE ONLY

Date	Action	Action	Action	

U.S. GOVERNMENT PRINTING OFFICE : 1969 O - 336-716

BLS 2716B

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Budget Bureau No. 44-R1157
Approval expires March 1970

(Supplementary form for reporting data on a combined establishment basis.)

Survey of Scientific and Technical Personnel in Industry, 1969

If you cannot complete the occupational employment data for the specific establishment, or reporting unit, identified on the address label of BLS Form 2716A, you may combine data for two or more establishments. However, if you do, it is important that you provide information on the distribution of employment by industry and size (table 1) and by State and occupation (table 2) relating to 1969 for all establishments covered by your report (BLS Form 2716A). It will, therefore, be unnecessary to complete the "Nature of Business" item (1.20).

Table 1. Distribution of Establishments and Employment by Industry and Size:

Industry group code (column a). Identify the industry codes applicable to the establishments covered by BLS Form 2716A according to the attached set of industry definitions. Use a separate line for each industry code.

Total establishments and employment (columns b and c). Enter the number of establishments and total employment for each industry code. Account for all employment reported in 1969 in item 1.10 on the first page of BLS Form 2716A.

Distribution of establishments and total employment (columns d through i). Enter the number of establishments and total employment in these establishments for each of the three size groups shown below. The sum of these establishments and employment should equal the amounts shown in columns b and c, respectively, for each designated industry code.

Industry group code (see attached definitions) (a)	Total number of establishments (b)	Total employment (c)	Establishments with 1-99 employees		Establishments with 100-999 employees		Establishments with 1,000 employees or more	
			Number of establishments (d)	Number employed (e)	Number of establishments (f)	Number employed (g)	Number of establishments (h)	Number employed (i)
TOTAL								

(over)

Table 2. Distribution of Employment by State and Occupation:

State (column a). Enter the name of each State for all establishments covered by BLS Form 2716A. Use a separate line for each State.

Total employment (column b). Enter the total employment covered by your report in each of these States. If numbers cannot be estimated, enter approximate percent of total employment in each State. (Account for all employees in item 1.10 on first page of BLS Form 2716A.)

Scientific personnel (columns c and d). Enter total number of Engineers, Mathematicians, Physical and Life Scientists covered by your report in each State in column (c) and Engineers separately in column (d). If numbers cannot be estimated, enter approximate percent of totals in each State. (Account for all employees in items 2.00 and 2.10 under column (a) on second page of BLS Form 2716A.)

Scientific personnel performing or managing research and development (columns e and f). Enter total number of Engineers, Mathematicians, Physical and Life Scientists in research and development covered by your report in each State in column (e), and Engineers in research and development separately in column (f). If number cannot be estimated, enter approximate percent of totals in each State. (Account for all employees in items 2.00 and 2.10 under column (b) on second page of BLS Form 2716A.)

State	Total employment	Scientific personnel		Scientific personnel performing or managing research and development	
		Total Engineers, Mathematicians, and Scientists	Engineers	Total Engineers, Mathematicians, and Scientists	Engineers
(a)	(b)	(c)	(d)	(e)	(f)
TOTAL					

BLS 2716A

Detailed Reporting Instructions

A Survey of Scientific and Technical Personnel in Industry, 1969

Contents

Section		Page
1.	REPORTING UNIT	2
2.	DEFINITION OF TERMS	2
	A. General	2
	B. Occupations	2
	C. Research and development functions	6
3.	FEDERAL GOVERNMENT WORK	7
4.	NATURE OF BUSINESS	7
5.	IN-HOUSE TRAINING IN SCIENCE AND TECHNOLOGY	7

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

Detailed Reporting Instructions

1. REPORTING UNIT

The establishment location for which data are requested is shown on the bottom line of the address label. County and State designation is generally used unless more specific detail is available. For purposes of this survey, an establishment is generally a single physical location, engaged in one predominant activity.

Because the establishments in this survey are selected on a sample basis to represent all sizes of establishments in all manufacturing and nonmanufacturing industries, multiunit companies may receive more than one questionnaire. It is important that you complete the questionnaire only for the establishments designated.

Total employment (item 1. 10) and business activity (item 1. 20) should be completed even if you do not employ engineers, scientists, or technicians. These items are essential to our estimating procedures. Providing us with this information will avoid unnecessary correspondence.

The letter saver on the back page of the questionnaire should be used if you are unable to report for the establishment designated or have trouble reporting the occupational data requested. For example, you may not have data available on an individual establishment basis, or you cannot determine which establishment should be included in your report because two or more are located in the designated area, or you have no establishment in the designated area. Please indicate in the space allocated on the front page of the questionnaire who we should contact to resolve any reporting problems.

2. DEFINITION OF TERMS

A. General

Employees in the specialized occupations covered by this survey should be counted on a "Working As" basis, as of the date of the report (mid-January 1969 or 1968) regardless of their field of degree or whether they hold a college degree. For example, an employee trained as an engineer but working as a mathematician as of the date of the report should be reported as a mathematician. Similarly, an employee trained as a biological technician but working as a medical technician as of the date of the report should be reported as a medical technician. If actual data are <u>not</u> available, estimates are acceptable. When data are not available and reasonable estimates are deemed to be impossible, please write "not available" in the appropriate items of the questionnaire.

B. Occupations

<u>ENGINEERS</u> (item 2. 10)

Count as engineers all persons actually engaged in chemical, civil, electrical, mechanical, metallurgical, or any other type of engineering work at a level which requires knowledge of engineering equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree. Include all en-

gineers in research and development, production, management, technical service, sales, and other positions which require them to use the indicated level of knowledge in their work. Exclude persons trained in engineering, but currently employed in positions not requiring the use of such training. Include architectural engineers; exclude architects.

MATHEMATICIANS (item 2.20)

Count as mathematicians only those persons whose positions require a knowledge of mathematics equivalent at least to that acquired through a 4-year college course with a major in mathematics and who spend the greatest proportion of their time in development or application of mathematical techniques, regardless of whether they hold a college degree. Include all mathematicians in research and development, production, management, technical service, sales, and other positions which require them to use the indicated level of knowledge in their work. Include actuaries, statisticians, and computer programmers only if they specialize in mathematical techniques. Exclude accountants.

PHYSICAL SCIENTISTS (item 2.30)

Count as physical scientists all chemists, physicists, metallurgists, geologists, geophysicists, and other physical and earth scientists who are actually engaged in scientific work at a level which requires a knowledge of the physical sciences equivalent to that acquired through completion of a 4-year college course with a major in one of the physical science fields, regardless of whether they hold a college degree. Include all physical scientists engaged in research and development, production, management, technical service, sales, and other positions which require them to use the indicated level of knowledge in their work. Exclude persons trained in the physical sciences but currently employed in positions not requiring the use of such training.

LIFE SCIENTISTS (item 2.40)

Count as life scientists all medical scientists, agricultural scientists, biological scientists, and other life scientists who are actually engaged in scientific work at a level which requires a knowledge of the life sciences equivalent to that acquired through completion of a 4-year college course with a major in one of the life science fields, regardless of whether they hold a college degree. Include all life scientists engaged in research and development, production, management, technical service, sales, and other positions which require them to use the indicated level of knowledge in their work. Exclude persons trained in the life sciences but currently employed in positions not requiring the use of such training. Exclude psychologists from this category, and report them in item 3.30. Definitions for medical, agricultural, and biological scientists follow.

Medical Scientists. Count as medical scientists only those physicians, dentists, public health specialists, pharmacists, and members of other scientific professions who meet the general requirements for "Life Scientists" and who are concerned with the understanding of human diseases and improvement of human health, and spend the greatest proportion of their time in clinical investigation or other research, production, technical writing, and related activities. Exclude from this category all practitioners—that is, those medical scientists who spend the greatest proportion of their time providing care to patients, dispensing drugs or services, or in diagnosis, etc. Persons working as pathologists, microbiologists, pharmacologists, etc., should be excluded from the figures for medical scientists and included in the figures for biological scientists.

Agricultural Scientists. Count as agricultural scientists all persons who meet the general requirements for "Life Scientists" and who are primarily concerned with the understanding and improvement of agricultural productivity, such as those working in agronomy, animal husbandry, forestry, horticulture, range management, soil culture, and veterinary science. Exclude veterinarians who spend the greatest proportion of their time providing care to animals, since they are primarily practitioners and are not within the scope of this survey.

Biological Scientists. Count as biological scientists all persons who meet the general requirements for "Life Scientists" and who spend the greatest proportion of their time in scientific work dealing with life processes other than those classified in the agricultural and medical sciences. Include pathologists, microbiologists, pharmacologists, bacteriologists, taxicologists, botanists, zoologists, etc.

ECONOMISTS, STATISTICIANS, AND PSYCHOLOGISTS (item 3).

Include all employees who are actually working as economists, statisticians, or psychologists, at a level which requires knowledge of these subjects equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree. Exclude persons trained in one of these fields who are currently employed in positions which do not specifically require the use of such training. Definitions for the individual occupations follow.

Economists. Count as economists those persons who meet the general requirements for this item and who perform studies, or are engaged in research, of a fundamentally economic nature, e. g., the analysis, interpretation, or forecasting of economic trends and conditions; the study of relationships within the economy—either of wide scope or in specialized areas such as finance, price movements, manpower, international trade, or domestic market conditions. Include market research analysts who are trained in economics and who utilize this knowledge in the performance of their duties. Also include persons whose primary function is to consult with or advise management on economic conditions and trends in the formulation of company plans or policy. Exclude accountants or fiscal analysts whose primary duties are to evaluate company costs or prepare corporate ratios.

Statisticians. Count as statisticians all persons, other than those reported as mathematicians, who meet the general requirements for this item and who are primarily engaged in the recurrent application of statistical techniques which involve the use of mathematical-statistical theory equivalent to that taught at the college level, regardless of college degrees held. For purposes of this survey, statistical techniques shall include the design of surveys or experiments as well as the collection, organization, interpretation, or analysis of numerical data. Such data may represent either complete enumeration or statistical samples. Persons counted within the framework of this definition may be employed in business fields such as finance, marketing, management analysis, or advertising; in social science fields such as economics, political science, demography, or psychology; in engineering fields; or in physical or life science fields such as biology, agriculture, pharmacology, or medicine. Exclude statisticians who are engaged solely in the development of mathematicial theory associated with the general application of statistical techniques—these persons should be reported as mathematicians. Also, exclude persons engaged in quality control, time or motion study applications, inventory control, computer programming, testing, etc., who utilize statistical techniques merely as an occasional tool in connection with the performance of other primary duties; these persons should be reported as engineers, economists, psychologists, technicians, or excluded entirely from the specialized personnel included in this survey—whichever is most appropriate.

Psychologists. Count as psychologists all persons who meet the general requirements for this item and who are concerned with the application or establishment or principles related to human behavior. Psychologists frequently will be engaged in specialized fields such as industrial, experimental, consumer, consulting, clinical, social, educational, or engineering psychology. Examples of psychologists range of job duties might include such provinces as: Consultation with management to furnish expert professional advice, opinion, assistance, or knowledge in the application and use of psychological methods, theories, and techniques; behavior modification through personal counseling, interviewing, management development, and industrial, communication programs; training and education for employees and managers; or measurement and evaluation of individual and group behavior through the application, development, administration, validation, and interpretation of psychological tests. Other job duties might be related to techniques of product design and development, including the application of knowledge derived from studies of consumer behavior and of human characteristics; research on personnel policies and practices; employee attitudes and motivation; job and organizational effectiveness; marketing and advertising, and the design, development, and operation of complex systems with regard to the human factors involved.

DRAFTSMEN, SURVEYORS, AND TECHNICIANS (item 4)

Count in this occupational grouping all persons actually engaged in technical work at a level which requires knowledge of engineering, mathematical, and physical or life sciences, comparable to that acquired either through study at technical institutes, junior colleges, or other formal post-high school training less extensive than a 4-year college course, or through equivalent on-the-job training or experience. Some typical job titles are draftsman, surveyor, laboratory assistant, physical science aid, and electronic technician. All persons in positions which require the indicated level of knowledge should be counted, regardless of job title or department in which employed. Computer programmers who meet the above definition of technicians should be reported on line 4.90 of the questionnaire, "Other technicians." Exclude those persons whose positions require knowledge or training consistent with the foregoing definitions of engineers, mathematicians, or scientists, and report them in the appropriate occupational category on the questionnaire. Also, exclude all craftsmen such as machinists and electricians, and specialized personnel such as airline pilots, navigators, flight engineers, and ships' officers. Separate definitions of electrical and electronic technicians; other engineering and physical science technicians; biological and agricultural technicians; and medical and dental technicians follow.

Electrical and Electronic Technicians. Count in this group technicians with a background in electrical or electronic theory, physical science, and mathematics which enables them to perform jobs above the routine operating or maintenance levels. Normally, such employees are engaged in constructing, repairing, testing, installing, modifying, operating, or even designing a variety of production or experimental types of complex electrical or electronic equipment.

Other Engineering and Physical Science Technicians. Count in this group technicians who assist engineers and physical scientists in both laboratory and production types of activities. Normally, these technicians work under the direct supervision of an engineer or scientist and assist him in those functions usually described as routine at the professional level.

Biological and Agricultural Technicians. Count in this group all life science technicians except medical and dental technicians, defined as follows.

Medical and Dental Technicians. Count in this group employees working as laboratory assistants whose duties include such operations as making laboratory tests; taking or developing X-ray pictures; constructing metal clamps, inlays, and bridge work according to specificaitions; and who in other ways assist in medical or dental research or laboratory operations. Exclude technicians whose primary function is care or treatment of patients, such as nurses.

C. Research and Development Functions

Include in this function those engineers; mathematicians; physical and life scientists; and draftsmen, surveyors, and technicians who spend the greatest proportion of their time performing, managing, or administering basic and applied research in engineering, mathematics, and physical and life sciences (including medicine) and in the design and development of prototypes and processes. If the primary objective of an activity is to make further improvements on the products or processes, then the work is research-development. If, on the other hand, the product or process is substantially operational and the primary objective is to develop markets, do preproduction planning, or get the production process going smoothly, then the work is no longer research-development. For purposes of this survey, research and development includes the activities described below whether assigned to separate research and development organizational units of the establishment, or carried on by laboratories and technical groups not part of a separate research and development unit per se.

(a) Pursuit of planned research for new knowledge, whether or not the search has reference to a specific application.

(b) Application of existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses.

(c) Application of existing knowledge to problems involved in the improvement of a present product or process.

Research and development excludes the following functions: Market research (including statistical surveys of product acceptance, estimates of market size, and studies of channels of distribution); market development (including the sale of either old or new products to obtain acceptance of them in new outlets); quality and quantity control tests and analyses; trouble-shooting in connection with breakdowns in full scale production, including related analytical work; technical plant sanitation control; work required for minor adaptations of a specific product to meet the requirements of a specific customer, including installation and servicing in a customer's plant; engineering and other technical service furnished in accordance with agreements to licensees outside the company; aid furnished by the research and development organization to manufacturing divisions to enable them to operate in accordance with previously determined formulas, standard practice instructions, or finished product specifications; aid furnished to develop advertising programs to promote or demonstrate new products or processes, including the development of material furnished for trial or demonstration; assistance in preparation of speeches and publications for persons not engaged in research and development; experimental work performed at the request of the patent division to provide information needed during the prosecution of a patent litigation, and technical writing.

3. FEDERAL GOVERNMENT WORK

Item 2C on the questionnaire is needed to obtain estimates of the total number of engineers, mathematicians, and scientists employed by industry whose work is involved directly with national defense, space, and other programs of the Federal Government. Work performed for the Federal Government includes production, research, development, testing, evaluation, or other activities under prime contracts with the Department of Defense, including the Army, Navy, Air Force, Marine Corps, Defense Atomic Support Agency, and all other Department of Defense organizations; the National Aeronautics and Space Administration; or other agencies of the Federal Government. Also, include work performed under subcontracts with prime contractors or other subcontractors. The production of standard items for sale (e.g., shelf or vendor items) to the Federal Government is not considered work performed for the Federal Government for purposes of this survey.

4. NATURE OF BUSINESS (item 1.20)

Occupational employment data obtained in this survey are published for 89 different industry groups. Therefore, please provide sufficient information on the business activity of each establishment included in the survey so that we can accurately classify it by industry. If your report covers only the central office, warehouse, or research laboratory of your company, please designate in section 1 of item 1.20 and omit other sections of this item. If your report covers two or more establishments which have unlike business activities, please note under "Remarks" on back page of questionnaire and omit response to item 1.20.

5. IN-HOUSE TRAINING IN SCIENCE AND TECHNOLOGY (item 2B)

The National Science Foundation and other Government agencies have responsibilities and support programs related to the education and training of scientific and technical personnel. Also they are aware that private industry makes significant contributions in this area for its own employees. Since the extent of industry's participation is unknown, response to this question should provide some general measures of the prevalence of in-house training.

A. Formal in-house training programs, for purposes of this survey, are defined as instruction, courses, lectures, seminars, etc., specifically related to science and technology. Include subjects, for example, on (1) new knowledge in scientific research or technical developments; (2) technical information required for performing current or new assignments; and (3) scientific or technical knowledge required for upgrading an employee's job. Exclude programs concerned with (1) general orientation on company policies and programs; (2) general management development; (3) supervision; and (4) other nontechnical subjects dealing with cost, finance, sales, communications, etc. Also exclude on-the-job training given at employee's work site.

B. The conduct of such programs is limited to training given at any of three types of locations: (1) The establishment(s) covered by this report; (2) another establishment, school, or training center owned or operated by the same company; or (3) an establishment, school, or training center owned or operated by another company where training is provided under a cooperative arrangement with the reporting establishment or its parent company. Specifically excluded are all types of training given by colleges, universities, or schools even though the reporting establishment, or its parent company, pay all or part of the costs associated with such training.

C. In-house training applies only to scientists and engineers (item 2.51) and technicians (item 2.52) in the establishment(s) covered by this report regardless of whether such training is available in other establishments of your company not covered by the survey.

U. S. GOVERNMENT PRINTING OFFICE : 1969 O - 336-714

BLS 2716B

Industry Definitions and Group Codes

(To be used in completing BLS Form 2716B when reporting data on a combined establishment basis)

A SURVEY OF SCIENTIFIC AND TECHNICAL PERSONNEL IN INDUSTRY

For purposes of this survey, American industry has been classified into 89 separate categories. Each category, or industry grouping, represents a single Standard Industrial Classification (SIC) code (see manual published by the Bureau of the Budget, 1967), or a grouping of these codes. The subdivisions used for this survey are identified in three ways: (1) An industry group code, (2) a descriptive name of the industries or types of business activity included in the group code, and (3) the related SIC code or codes. These three identifying elements are specified in the list of industry classifications which follows.

Industry group code	Principal product or service	Related SIC codes
01	Ammunition, sighting and fire control equipment (Excludes small arms ammunition.)	192 & 194
02	All other ordnance and accessories (Excludes group code 01.)	191, 193 & 195-9
03	Grain mill products and sugar (Includes prepared feeds for animals and fowls.)	204 & 206
04	All other food and kindred products (Includes related items such as ice, chewing gum, fats and oils.)	201-3, 205, & 207-9
05	Tobacco manufactures (Excludes the manufacture of insecticides made from tobacco byproducts.)	21
06	Textile mill products	22
07	Apparel and other textile products	23
08	Lumber and wood products	24
09	Furniture and fixtures (made from wood, metal, or other products.)	25
10	Paper and allied products (Includes the manufacturing of pulps from wood or other cellulose products.)	26

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

Industry group code	Principal product or service	Related SIC codes
11	Printing and publishing (Excludes news syndicates and textile product printing or finishing.)	27
	CHEMICALS AND ALLIED PRODUCTS	
12	Industrial chemicals (Excludes products made from these chemicals.)	281
13	Plastics materials and synthetics (Excludes the manufacture of finished products made from these materials and glass or glass products.)	282
14	Drugs	283
15	Soaps, cleaners, toilet goods, paints, gum and wood chemicals, and Miscellaneous chemicals products	284-6 & 289
16	Agricultural chemicals (fertilizers, pesticides, etc.)	287
	PETROLEUM REFINING AND RELATED INDUSTRIES	
17	Petroleum refining (Excludes the production of natural gas and the manufacture of lubricants by blending and compounding purchased materials.)	291
18	Paving and roofing materials, and miscellaneous petroleum and coal products	295 & 299
	RUBBER, PLASTICS AND LEATHER PRODUCTS (Excludes manufacture of rubberized clothing; fabrics, webbing, and the production of basic plastics materials.)	
19	Rubber, footwear, and reclaimed rubber	302-303
20	All other rubber and plastics products (Excludes group code 19.)	301 & 306-7
21	Leather and leather products (Includes artificial leather products.)	31
	STONE, CLAY, AND GLASS PRODUCTS	
22	Hydaulic cement; concrete, gypsum, and plaster products; and miscellaneous non-metallic mineral products	324, 327 & 329
23	All other stone, clay, and glass products (Excludes group code 22 and the manufacture of ophthalmic lenses.)	321-3, 325-6, & 328

3 4

Industry group code	Principal product or service	Related SIC codes
	PRIMARY METAL INDUSTRIES	
24	Blast furnace and basic steel products (Excludes foundries, as well as primary and secondary smelting and refining of nonferrous metals.)	331
25	Iron and steel foundries and forgings (Do not use this code unless it is the principal activity of the reporting unit.)	332 & 3391
26	Smelting, refining, and finishing of nonferrous metals (Do not use this code unless it is the principal activity of the reporting unit.)	333-6 & 3392 & 3399
	FABRICATED METAL PRODUCTS	
27	Metal cans; cutlery, hand tools, and hardware; heating apparatus (except electrical) and plumbing fixtures; screw machine products and fasteners; metal stampings; coating and allied services; and miscellaneous fabricated wire products	341-3 & 345-8
28	Fabricated structural metal products	344
29	Miscellaneous fabricated metal products (Excludes plumbers brass goods.)	349
	MACHINERY (EXCEPT ELECTRICAL)	
30	Engines and turbines (Excludes aircraft and rocket engines; automotive engine, except diesel; engine generator sets; and locomotives.)	351
31	Farm machinery and equipment (Excludes machinery and equipment used primarily for construction purposes.)	352
32	Construction, mining, materials handling machinery and equipment; metalworking machinery and equipment; special and general industrial machinery and equipment, except electrical; and service industry machinery (Includes elevators and moving stairways; conveying equipment; hoists; exhaust and ventilating fans; refrigeration machinery (except household) and complete air conditioning units; and measuring and dispensing pumps. Excludes transportation equipment, hand tools (except power driven), and electrical household appliances. Machines powered by "built in," or detachable motors ordinarily are included in this group.)	353-6 & 358
33	Office and computing machines (Includes scales and balances, except laboratory. Classify photo-copy equipment in industry group code 47.)	357
34	Miscellaneous machinery, except electrical (Includes machine shops engaged in jobbing, repair, or manufacturing of special machinery or parts—not elsewhere classified.)	359
	ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES	
35	Electric test and distributing equipment, and industrial apparatus (Excludes manufacturing of frequency transformers, current-carrying devices, turbo generators, and automatic temperature controls.)	361-2
36	Household appliances (Excludes commerical cooking equipment, industrial refrigeration, commercial laundry equipment, and industrial vacuum cleaners.)	363
37	Electric lighting and wiring equipment (Excludes glass blanks for bulbs, lamp components such as filaments, etc.; production of glass ware for lighting fixtures; porcelain and glass insulators.)	364
38	Radio and television receiving equipment (except communication types) and phonograph records	365
39	Communications equipment (Excludes manufacturing of transmitting tubes.)	366
40	Electronic components and accessories (Includes the manufacturing of electron tubes, except X-ray tubes.)	367
41	Miscellaneous electrical machinery, equipment, and supplies (Includes the manufacturing of storage and primary batteries; X-ray tubes; electrical equipment for internal combusion engines, and electrical items, not classified elsewhere.)	369

5 6

Industry group code	Principal product or service	Related SIC codes
	TRANSPORTATION EQUIPMENT	
42	Motor vehicles and equipment (Excludes the manufacturing of motorcycles, track laying tractors, combat tanks, tires and tubes, automobile glass, vehicular lighting equipment, ignition systems, and storage batteries.)	371
43	Aircraft and parts (Excludes the manufacturing of aeronautical instruments and electrical equipment.)	372
44	Ship and boats building and repairing; railroad equipment; motorcycles, bicycles, and parts; and miscellaneous transportation equipment (Excludes the fabricating of structural assemblies or components for ships; and shops owned or operated by railroads or transit companies, which build or repair cars for their own use.)	373-5 & 379
	INSTRUMENTS AND RELATED PRODUCTS	
	(Excludes manufacturing of sighting and fire control instruments; molded glass blanks; unsensitized paper stock, mounts, easels, and folders for photographic use; photographic chemicals; flash, flood, and projection lamps; glass and unbreakable crystals.)	
45	Engineering and scientific instruments (Excludes optical, surgical, dental, and mechanical measuring instruments and tools; and electrical measuring and recording instruments.)	381
46	Mechanical measuring and control devices (Excludes the manufacturing of industrial electric controls.)	382
47	Optical instruments and lenses and photographic equipment and supplies	383 & 386
48	Medical instruments and supplies, ophthalmic goods, watches, clocks and watchcases	384-5 & 387

Industry group code	Principal product or service	Related SIC codes
	MISCELLANEOUS MANUFACTURING INDUSTRIES	
49	Jewelry, silverware, and plated ware; musical instruments and parts; toys, and sporting goods; pens, pencils, and artists supplies; costume jewelry and notions (Excludes athletic apparel; small arms ammunition and firearms; drafting instruments; and children's bicycles.)	391, 393-396
50	Miscellaneous manufacturing industries, not elsewhere classified	399
	AGRICULTURAL SERVICES, FORESTRY, AND FISHERIES	
51	Animal husbandry services (Excludes establishments engaged in poultry raising; and commercial kennels primarily engaged in raising dogs.)	072
52	Horticultural services, hunting and trapping, game propagation, forestry, and fisheries (Excludes logging camps and logging contractors.)	073-4, 08 & 09
	MINING (SOLIDS, AND LIQUIDS)	
53	Metal mining	10
54	Anthracite and bituminous coal, and lignite mining	11 & 12
55	Crude petroleum and natural gas (Excludes field services for operators on a contract or fee basis.)	131
56	Natural gas liquids, and oil and gas field services (Includes field services for operators on a contract or fee basis.)	132 & 138
57	Quarrying and extracting stone, sand and gravel, and clay ceramic and refractory minerals	141-5
58	Mining, or otherwise preparing, other non-metallic minerals, except fuels	147-9
	CONTRACT CONSTRUCTION	
59	Central building contractors	15
60	Highway and street construction	161
61	Heavy construction, except highway and street	162
62	Plumbing, heating, air conditioning, and electrical contractors	171 & 173
63	All other special trade contractors (Excludes group code 62.)	172 & 174-9

Industry group code	Principal product or service	Related SIC codes
	TRANSPORTATION AND RELATED SERVICES	
64	Railroads, sleeping and dining car service, and railway express service (Includes repair shops.)	4011, 402 & 404 (except 4013)
65	Switching and terminal companies (Excludes such activities when operated by railroad companies.)	4013
66	Local and suburban transportation	411
67	Trucking, local and long distance	421
68	Water transportation	44
69	Transportation by air (Includes terminal services.)	45
70	Pipe line transportation (pipe line transportation of natural gas is classified in industry group code 76.)	46
71	Transportation services	47
	COMMUNICATION AND RELATED SERVICES	
72	Telephone communication (wire or radio)	481
73	Telegraph communication (wire and radio)	482
74	Radio and television broadcasting	483
75	Other communication services	489
	ELECTRIC, GAS, AND SANITARY SERVICES	
76	Electric and gas companies and systems	491 & 492
78	Combination companies and systems (Includes companies that provide gas or electric services, in combination with other utility services.)	493
79	Water supply, sanitary services, steam supply and irrigation systems	494-7
	WHOLESALE AND RETAIL TRADE	
80	Wholesale trade—dry goods and apparel, groceries, and farm product-raw material	503-5
81	Wholesale trade—motor vehicles and automotive equipment; drugs and chemicals; electrical goods; hardware, plumbing, and heating equipment and other miscellaneous wholesalers (except machinery, equipment, and supplies.)	501-2, 506-7 & 509
82	Wholesale trade—machinery, equipment, and supplies	508
83	Retail trade—building materials, and farm equipment, general merchandise; food; eating and drinking places; and other miscellaneous retail stores (Note: Excludes automotive dealers, gasoline service stations, and the retail sale of apparel, accessories, home furnishings and equipment. These types of retail stores are not within the scope of this survey. Retail department stores, however, which sell a wide variety of products are classified within SIC 53 and, therefore, are covered by this survey.)	52-54 & 58-59
	FINANCE, INSURANCE, AND REAL ESTATE	
84	Finance and real estate	60-62 & 64-67
85	Insurance carriers	63
	SERVICES	
86	Hotels and lodging places; personal services; automobile and miscellaneous repair; amusement and recreation; advertising; and legal services (Excludes commercial laboratories, and miscellaneous business and consulting services.)	70, 72; 731-6 & 75, 76, 78, 79 & 81
87	Commercial research, development, and testing laboratories; business and management consulting services; and other miscellaneous business services (Laboratories operated primarily to service their company's own manufacturing activities should be assigned the industry group code of these activities.)	739
88	Medical and dental laboratories	807
89	Engineering and architectural services	891

III. Statistical tables

Table 1. Employment of scientists, engineers, and technicians by industry, 1969

Industry	Scientists and engineers	Engineers	Scientists	Technicians
Total, all industries	1,062,500	849,000	213,500	772,500
Manufacturing	735,700	586,500	149,200	421,900
Durable goods manufacturing, total	567,400	501,300	66,100	346,100
Ordnance and accessories	63,000	54,200	8,800	20,100
Stone, clay, and glass products	12,100	9,700	2,400	7,000
Primary metal industries	32,100	21,600	10,500	19,700
Fabricated metal products	31,200	28,700	2,500	25,400
Machinery, except electrical	89,800	81,100	8,700	76,300
Specialized machinery and equipment	50,100	47,800	2,300	41,300
Office and computing machines	26,300	20,800	5,500	24,800
Electrical machinery	160,600	146,700	13,900	106,400
Electrical distribution equipment	32,600	30,700	1,900	23,100
Communications equipment	7[illegible],600	71,300	7,300	45,200
Electronic components and accessories	28,200	24,800	3,400	23,400
Transportation equipment	135,900	123,700	12,200	61,800
Motor vehicles	32,400	29,100	3,300	16,600
Aircraft and parts	98,100	89,300	8,800	37,600
Instruments and related products	35,800	30,000	5,800	23,300
Other durable goods manufacturing [1]	6,900	5,600	1,300	6,100
Nondurable goods manufacturing, total	168,300	85,200	83,100	75,800
Food and kindred products	14,700	7,400	7,300	5,900
Textiles and apparel products	5,800	3,700	2,100	2,900
Paper and allied products	14,700	9,200	5,500	6,800
Chemicals and allied products	103,500	4,200	59,300	45,400
Industrial chemicals	44,900	3,200	21,700	19,800
Plastics and synthetics, except glass	18,900	0,800	8,100	8,900
Drugs	17,100	1,700	15,400	6,000
Petroleum refining and related industries	12,700	8,800	3,900	6,900
Rubber and miscellaneous plastics products	14,400	10,400	4,000	5,900
Other nondurable goods manufacturing [2]	2,500	1,500	1,000	2,000
Nonmanufacturing, total	326,800	262,500	64,300	350,600
Metal, coal, and nonmetallic mining	7,600	6,200	1,400	4,400
Crude petroleum and natural gas extraction	25,800	12,500	13,300	9,300
Contract construction	47,700	46,800	900	31,500
Transportation and related services	9,000	7,400	1,600	8,000
Communications and related services	19,100	18,700	400	38,600
Electric, gas, and sanitary services	28,300	27,000	1,300	23,500
Wholesale and retail trade	29,200	20,800	8,400	39,700
Finance, insurance, and real estate	9,800	4,700	5,100	6,300
Business services	149,600	118,300	31,300	188,500
Commercial laboratories	73,000	48,600	24,400	50,700
Medical and dental laboratories	1,800	-	1,800	22,500
Engineering and architectural services	74,300	69,300	5,000	114,900
Other nonmanufacturing [3]	700	100	600	800

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 2. Employment of scientists, engineers, and technicians by industry, 1968

Industry	Scientists and engineers	Engineers	Scientists	Technicians
Total, all industries	1,022,300	818,200	204,100	753,400
Manufacturing	720,600	575,100	145,500	419,400
Durable goods manufacturing, total	558,900	494,600	64,300	347,400
Ordnance and accessories	62,400	53,700	8,700	21,100
Stone, clay, and glass products	11,700	9,400	2,300	6,500
Primary metal industries	29,800	19,700	10,100	19,000
Fabricated metal products	29,000	26,600	2,400	25,100
Machinery, except electrical	84,500	76,700	7,800	75,800
Specialized machinery and equipment	48,600	46,300	2,300	42,000
Office and computing machines	22,900	18,100	4,800	23,500
Electrical machinery	162,700	148,900	13,800	108,300
Electrical distribution equipment	32,300	30,600	1,700	23,800
Communications equipment	81,000	73,300	7,700	46,000
Electronic components and accessories	29,100	25,800	3,300	23,900
Transportation equipment	137,300	124,600	12,700	63,100
Motor vehicles	31,800	28,500	3,300	16,100
Aircraft and parts	99,900	90,600	9,300	39,500
Instruments and related products	35,300	29,800	5,500	22,800
Other durable goods manufacturing [1]	6,200	5,200	1,000	5,700
Nondurable goods manufacturing, total	161,700	80,500	81,200	72,000
Food and kindred products	14,400	7,100	7,300	5,400
Textiles and apparel products	5,200	3,200	2,000	2,700
Paper and allied products	14,100	8,700	5,400	6,500
Chemicals and allied products	100,200	42,400	57,800	43,500
Industrial chemicals	44,200	22,500	21,700	18,900
Plastics and synthetics, except glass	18,200	10,200	8,000	8,400
Drugs	16,200	1,600	14,600	5,600
Petroleum refining and related industries	12,400	8,400	4,000	6,600
Rubber and miscellaneous plastics products	13,000	9,300	3,700	5,500
Other nondurable goods manufacturing [2]	2,400	1,400	1,000	1,800
Nonmanufacturing	301,700	243,100	58,600	334,000
Metal, coal, and nonmetallic mining	7,100	5,600	1,500	4,100
Crude petroleum and natural gas extraction	25,000	12,100	12,900	9,000
Contract construction	42,800	42,100	700	28,100
Transportation and related services	8,000	6,900	1,100	7,100
Communications and related services	19,200	18,800	400	36,500
Electric, gas, and sanitary services	26,100	25,000	1,100	22,400
Wholesale and retail trade	26,700	19,400	7,300	38,600
Finance, insurance, and real estate	9,200	4,400	4,800	6,000
Business services	137,000	108,700	28,300	181,400
Commercial laboratories	65,400	43,300	22,100	50,100
Medical and dental laboratories	1,600	-	1,600	21,600
Engineering and architectural services	69,500	65,000	4,500	109,400
Other nonmanufacturing [3]	600	100	500	800

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 3. Employment of scientists and enginee

Industry	Scientists and engi			Technicians		
	Total	R & D		Total	R & D	
		Number	Percent		Number	Percent
Total, all industries	1,062,500	389,600	36.7	772,500	179,800	23.3
Manufacturing	735,700	314,700	42.8	421,900	138,300	32.8
Durable goods manufacturing, total	567,400	252,300	44.5	346,100	109,700	31.7
Ordnance and accessories	63,000	34,300	54.4	20,100	9,900	49.3
Stone, clay, and glass products	12,100	3,600	29.8	7,000	1,500	21.4
Primary metal industries	32,100	4,200	13.1	19,700	3,100	15.7
Fabricated metal products	31,200	9,100	29.2	25,400	5,000	19.7
Machinery, except electrical	89,800	33,200	37.0	76,300	16,900	22.1
Specialized machinery and equipment	50,100	12,700	25.3	41,300	6,900	16.7
Office and computing machines	26,300	15,000	57.0	24,800	8,000	32.3
Electrical machinery	160,600	79,800	49.7	106,400	41,100	38.6
Electrical distribution equipment	32,600	13,900	42.6	23,100	5,400	23.4
Communications equipment	78,600	44,900	57.1	35,200	24,000	53.1
Electronic components and accessories	28,200	11,400	40.4	23,400	7,100	30.3
Transportation equipment	135,900	71,400	52.5	61,800	24,200	39.2
Motor vehicles	32,400	10,100	31.2	16,600	7,000	42.2
Aircraft and parts	98,100	59,300	60.4	37,600	16,500	43.9
Instruments and related products	35,800	15,200	42.5	23,300	7,100	30.5
Other durable goods manufacturing [1]	6,900	1,500	21.7	6,100	900	14.8
Nondurable goods manufacturing, total	168,300	62,400	37.1	75,800	28,600	37.7
Food and kindred products	14,700	4,300	29.3	5,900	1,400	23.7
Textiles and apparel products	5,800	1,900	32.8	2,900	400	13.8
Paper and allied products	14,700	4,900	33.3	6,800	1,800	26.5
Chemicals and allied products	103,500	43,600	42.1	45,400	21,000	46.3
Industrial chemicals	44,900	19,000	42.3	19,800	10,300	52.0
Plastics and synthetics, except glass	18,900	6,400	33.9	8,900	5,100	57.3
Drugs	17,100	9,100	53.2	6,000	3,600	60.0
Petroleum refining and related industries	12,700	3,300	26.0	6,900	2,000	29.0
Rubber and miscellaneous plastics products	14,400	3,500	24.3	5,900	1,200	20.3
Other nondurable goods manufacturing [2]	2,500	900	36.0	2,000	800	40.0
Nonmanufacturing, total	326,800	74,900	22.9	350,600	41,500	11.8
Metal, coal, and nonmetallic mining	7,600	800	10.5	4,400	500	11.4
Crude petroleum and natural gas extraction	25,800	4,400	17.1	9,300	1,200	12.9
Contract construction	47,700	4,500	9.4	31,500	1,200	3.8
Transportation and related services	9,000	900	10.0	8,000	200	2.5
Communications and related services	19,100	1,100	5.8	38,600	500	1.3
Electric, gas, and sanitary services	28,300	1,500	5.3	23,500	300	1.3
Wholesale and retail trade	29,200	4,300	14.7	39,700	2,800	7.1
Finance, insurance, and real estate	9,800	1,100	11.2	6,300	200	3.2
Business services	149,600	56,300	37.6	188,500	34,600	18.4
Commercial laboratories	73,000	45,500	62.3	50,700	22,400	44.2
Medical and dental laboratories	1,800	400	22.2	22,500	1,000	4.4
Engineering and architectural services	74,300	10,400	14.0	114,900	11,200	9.7
Other nonmanufacturing [3]	700	-	-	800	-	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 4. Employment of scientists and engineers, and technicians in research and development by industry, 1968

Industry	Scientists and engineers			Technicians		
	Total	R & D		Total	R & D	
		Number	Percent		Number	Percent
Total, all industries	1,022,300	385,800	37.7	753,400	175,500	23.3
Manufacturing	720,600	315,600	43.8	419,400	134,900	32.2
Durable goods manufacturing, total	558,900	254,100	45.5	347,400	107,200	30.9
Ordnance and accessories	62,400	34,000	54.5	21,100	9,700	46.0
Stone, clay, and glass products	11,700	3,200	27.4	6,500	1,500	23.1
Primary metal industries	29,800	3,900	13.1	19,000	3,100	16.3
Fabricated metal products	29,000	8,500	29.3	25,100	4,700	18.7
Machinery, except electrical	84,500	34,300	40.6	75,800	16,500	21.8
Specialized machinery and equipment	48,600	13,100	27.0	42,000	6,700	15.9
Office and computing machines	22,900	15,400	67.2	23,500	7,800	33.2
Electrical machinery	162,700	80,900	49.7	108,300	40,800	37.7
Electrical distribution equipment	32,300	13,800	42.7	23,800	5,000	21.0
Communications equipment	81,000	46,300	57.2	46,000	24,800	53.9
Electronic components and accessories	29,100	11,800	40.5	23,900	6,700	28.0
Transportation equipment	137,300	71,900	52.4	63,100	24,300	38.5
Motor vehicles	31,800	9,900	31.1	16,100	6,600	41.0
Aircraft and parts	99,900	60,300	60.4	39,500	17,100	43.3
Instruments and related products	35,300	15,600	44.2	22,800	6,300	27.6
Other durable goods manufacturing [1]	6,200	1,800	29.0	5,700	800	14.0
Nondurable goods manufacturing, total	161,700	62,300	38.5	72,000	27,700	38.5
Food and kindred products	14,400	4,200	29.2	5,400	1,400	25.9
Textiles and apparel products	5,200	1,700	32.7	2,700	400	14.8
Paper and allied products	14,100	4,700	33.3	6,500	1,800	27.7
Chemicals and allied products	100,200	43,000	42.9	43,500	20,200	46.3
Industrial chemicals	44,200	18,700	42.3	18,900	10,000	52.9
Plastics and synthetics, except glass	18,200	6,600	36.3	8,400	4,800	57.1
Drugs	16,200	7,600	46.9	5,600	3,400	60.7
Petroleum refining and related industries	12,400	3,400	27.4	6,600	1,900	28.8
Rubber and miscellaneous plastics products	13,000	4,300	33.1	5,500	1,200	21.8
Other nondurable goods manufacturing [2]	2,400	1,000	41.7	1,800	800	44.4
Nonmanufacturing, total	301,700	69,400	23.0	334,000	40,600	12.2
Metal, coal, and nonmetallic mining	7,100	700	9.9	4,100	500	12.2
Crude petroleum and natural gas extraction	25,000	4,200	16.8	9,000	1,200	13.3
Contract construction	42,800	3,600	8.4	28,100	1,200	4.3
Transportation and related services	8,000	800	10.0	7,100	200	2.8
Communications and related services	19,200	900	4.7	36,500	500	1.4
Electric, gas, and sanitary services	26,100	1,400	5.4	22,400	300	1.3
Wholesale and retail trade	26,700	3,900	14.6	38,600	2,700	7.0
Finance, insurance, and real estate	9,200	1,000	10.9	6,000	200	3.3
Business services	137,000	52,900	38.6	181,400	33,800	18.6
Commercial laboratories	65,400	41,700	63.8	50,100	21,900	43.7
Medical and dental laboratories	1,600	300	18.8	21,600	1,100	5.1
Engineering and architectural services	69,500	10,900	15.7	109,400	10,800	9.9
Other nonmanufacturing [3]	600	-	-	800	-	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 5. Employment of scientists by occupation and industry, 1969

Industry	Total	Physical scientists						Life scientists	Mathematicians
		Total	Chemists	Physicists	Metallurgists	Geologists and geophysicists	Other		
Total, all industries	213,500	150,900	90,500	20,600	15,200	15,900	8,700	23,600	39,000
Manufacturing	149,200	111,200	76,600	13,300	14,000	1,100	6,200	16,800	21,200
Durable goods manufacturing, total	66,100	46,600	18,700	10,800	13,200	500	3,400	1,600	17,900
Ordnance and accessories	8,800	4,700	1,500	2,500	400	200	100	200	3,900
Stone, clay, and glass products	2,400	2,200	1,400	300	200	200	100	-	200
Primary metal industries	10,500	10,000	2,900	200	6,500	-	400	-	500
Fabricated metal products	2,500	2,100	1,000	300	800	-	-	-	400
Machinery, except electrical	8,700	4,900	2,000	1,000	1,400	-	500	200	3,600
Specialized machinery and equipment	2,300	1,800	900	100	700	-	100	-	500
Office and computing machines	5,500	2,400	1,100	900	300	-	100	200	2,900
Electrical machinery	13,900	9,400	2,800	3,400	1,400	-	1,800	300	4,200
Electrical distribution equipment	1,900	1,600	600	300	400	-	300	-	300
Communications equipment	7,300	4,700	900	1,800	600	-	1,400	200	2,400
Electronic components and accessories	3,400	2,000	900	800	200	-	100	-	1,400
Transportation equipment	12,200	7,700	3,100	2,000	2,200	100	300	100	4,400
Motor vehicles	3,300	2,500	1,000	400	900	-	100	-	700
Aircraft and parts	8,800	5,200	2,100	1,600	1,300	100	200	100	3,600
Instruments and related products	5,800	4,700	3,200	1,100	300	-	100	500	600
Other durable goods manufacturing [1]	1,300	900	800	-	-	-	100	300	100
Nondurable goods manufacturing, total	83,100	64,600	57,900	2,500	800	600	2,800	15,200	3,300
Food and kindred products	7,300	4,600	4,300	-	-	-	300	2,300	400
Textiles and apparel products	2,100	1,900	1,800	-	-	-	100	-	200
Paper and allied products	5,500	4,100	3,300	100	-	100	600	1,000	400
Chemicals and allied products	59,300	45,700	41,600	2,200	800	200	900	11,900	1,700
Industrial chemicals	21,700	19,100	16,800	1,500	500	100	200	1,300	1,300
Plastics and synthetics, except glass	8,100	7,500	6,700	300	100	-	400	500	100
Drugs	15,400	6,400	6,100	200	-	-	100	8,800	200
Petroleum refining and related industries	3,900	3,700	3,300	100	-	300	-	-	200
Rubber and miscellaneous plastics products	4,000	3,700	2,700	100	-	-	900	-	300
Other nondurable goods manufacturing [2]	1,000	900	900	-	-	-	-	-	100
Nonmanufacturing, total	64,300	39,700	13,900	7,300	1,200	14,800	2,500	6,800	17,800
Metal, coal, and nonmetallic mining	1,400	1,400	400	-	200	800	-	-	-
Crude petroleum and natural gas extraction	13,300	12,900	500	200	-	12,000	200	-	400
Contract construction	900	400	100	-	-	300	-	-	500
Transportation and related services	1,600	600	200	-	-	100	300	-	1,000
Communications and related services	400	-	-	-	-	-	-	-	400
Electric, gas, and sanitary services	1,300	800	400	-	-	300	100	200	300
Wholesale and retail trade	8,400	4,000	3,000	400	300	100	200	1,100	3,300
Finance, insurance, and real estate	5,100	-	-	-	-	-	-	400	4,700
Business services	31,300	19,600	9,300	6,700	700	1,200	1,700	4,500	7,200
Commercial laboratories	24,400	16,300	8,500	5,500	500	600	1,200	2,700	5,400
Medical and dental laboratories	1,800	200	200	-	-	-	-	1,600	-
Engineering and architectural services	5,000	3,100	600	1,200	200	600	500	200	1,700
Other nonmanufacturing [3]	600	-	-	-	-	-	-	600	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 6. Employment of technicians by occupation and industry, 1969

Industry	Total	Draftsmen	Surveyors	Engineering and physical technicians			Life science technicians	All other
				Total	Electrical and electronic	Other		
Total, all industries	772,500	275,500	27,100	352,600	117,900	174,700	30,300	87,000
Manufacturing	421,900	140,800	1,400	227,200	97,700	129,500	6,300	46,200
Durable goods manufacturing, total	346,100	131,000	1,200	182,400	93,700	88,700	1,100	30,400
Ordnance and accessories	20,100	4,300	-	14,800	9,000	5,800	-	1,000
Stone, clay, and glass products	7,000	2,600	100	3,000	700	2,300	100	1,200
Primary metal industries	19,700	5,500	200	10,800	1,700	9,100	100	3,100
Fabricated metal products	25,400	17,400	200	6,200	1,400	4,800	-	1,600
Machinery, except electrical	76,300	38,700	100	30,200	14,800	15,400	200	7,100
Specialized machinery and equipment	41,300	28,900	-	8,000	2,500	5,500	200	4,200
Office and computing machines	24,800	3,600	100	19,500	11,800	7,700	-	1,600
Electrical machinery	106,400	30,100	400	68,900	49,100	19,800	100	6,900
Electrical distribution equipment	23,100	9,300	100	12,200	9,500	2,700	100	1,400
Communications equipment	45,200	11,400	100	30,700	20,600	10,100	-	3,000
Electronic components and accessories	23,400	3,900	200	17,700	14,400	3,300	-	1,600
Transportation equipment	61,800	22,200	100	34,300	9,300	25,000	100	5,100
Motor vehicles	16,600	6,500	-	9,100	300	8,800	-	1,000
Aircraft and parts	37,600	10,700	-	22,900	8,200	14,700	100	3,900
Instruments and related products	23,300	6,600	-	12,500	7,100	5,400	500	3,700
Other durable goods manufacturing [1]	6,100	3,600	100	1,700	600	1,100	-	700
Nondurable goods manufacturing, total	75,800	9,800	200	44,800	4,000	40,800	5,200	15,800
Food and kindred products	5,900	800	-	2,100	400	1,700	900	2,100
Textiles and apparel products	2,900	300	-	1,200	200	1,000	-	1,400
Paper and allied products	6,800	1,400	100	4,100	800	3,300	100	1,100
Chemicals and allied products	45,400	4,400	-	28,300	1,700	26,600	4,200	8,500
Industrial chemicals	19,800	2,800	-	13,300	800	12,500	700	3,000
Plastics and synthetics, except glass	8,900	800	-	6,400	400	6,000	100	1,600
Drugs	6,000	200	-	1,700	100	1,600	3,100	1,000
Petroleum refining and related industries	6,900	800	100	4,900	300	4,600	-	1,100
Rubber and miscellaneous plastics products	5,900	1,500	-	3,200	200	3,000	-	1,200
Other nondurable goods manufacturing [2]	2,000	600	-	1,000	400	600	-	400
Nonmanufacturing, total	350,600	134,700	25,700	125,400	80,200	45,200	24,000	40,800
Metal, coal, and nonmetallic mining	4,400	600	800	2,100	300	1,800	200	700
Crude petroleum and natural gas extraction	9,300	3,100	600	3,600	1,200	2,400	-	2,000
Contract construction	31,500	17,800	3,200	7,800	6,400	1,400	-	2,700
Transportation and related services	8,000	2,200	1,100	3,100	1,900	1,200	-	1,600
Communications and related services	38,600	1,300	200	34,800	23,600	11,200	-	2,300
Electric, gas, and sanitary services	23,500	6,600	1,600	12,300	7,100	5,200	100	2,900
Wholesale and retail trade	39,700	5,500	-	20,700	17,700	3,000	1,800	11,700
Finance, insurance, and real estate	6,300	700	-	500	100	400	200	4,900
Business services	188,500	96,900	18,200	40,500	21,900	18,600	21,100	11,800
Commerical laboratories	50,700	16,500	200	28,600	14,800	13,800	500	4,900
Medical and dental laboratories	22,500	-	-	-	-	-	20,500	2,000
Engineering and architectural services	114,900	80,200	18,000	11,900	7,100	4,800	100	4,700
Other nonmanufacturing [3]	800	-	-	-	-	-	600	200

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 7. Employment of scientists and engineers in research and development by occupation and industry, 1969

Industry	Scientists and engineers	Engineers	Scientists	Physical scientists						Life scientists	Mathematicians
				Total	Chemists	Physicists	Metallurgists	Geologists and geophysicists	Other		
Total, all industries	389,600	289,900	99,700	73,900	48,200	14,000	5,500	3,100	3,100	11,000	14,800
Manufacturing	314,700	241,700	73,000	55,700	40,100	8,500	4,700	500	1,900	8,000	9,300
Durable goods manufacturing, total	252,300	221,200	31,100	21,900	9,500	6,700	4,200	400	1,100	600	8,600
Ordnance and accessories	34,300	29,200	5,100	2,900	800	1,500	2,300	200	100	200	2,000
Stone, clay, and glass products	3,600	1,800	1,800	1,800	1,100	300	100	200	100	-	-
Primary metal industries	4,200	2,900	1,300	1,300	400	100	800	-	-	-	-
Fabricated metal products	9,100	7,700	1,400	1,400	700	300	400	-	-	-	-
Machinery, except electrical	33,200	28,900	4,300	2,500	1,200	400	700	-	200	-	1,800
Specialized machinery and equipment	12,700	11,600	1,100	1,000	600	100	300	-	-	-	100
Office and computing machines	15,000	12,400	2,600	1,000	600	300	100	-	-	-	1,600
Electrical machinery	79,800	72,300	7,500	5,300	1,900	2,300	500	-	600	100	2,100
Electrical distribution equipment	13,900	12,700	1,200	900	400	300	100	-	100	-	300
Communications equipment	44,900	41,200	3,700	2,300	800	1,000	100	-	400	100	1,300
Electronic components and accessories	11,400	9,700	1,700	1,300	400	700	100	-	100	-	400
Transportation equipment	71,400	64,800	6,600	4,000	1,700	1,100	1,200	-	-	100	2,500
Motor vehicles	10,100	9,100	1,000	800	500	100	200	-	-	-	200
Aircraft and parts	59,300	53,800	5,500	3,200	1,200	1,000	1,000	-	-	100	2,200
Instruments and related products	15,200	12,500	2,700	2,400	1,400	700	200	-	100	100	200
Other durable goods manufacturing [1]	1,500	1,100	400	300	300	-	-	-	-	100	-
Nondurable goods manufacturing, total	62,400	20,500	41,900	33,800	30,600	1,800	500	100	800	7,400	700
Food and kindred products	4,300	900	3,400	2,300	2,000	-	-	-	300	1,100	-
Textiles and apparel products	1,900	900	1,000	1,000	1,000	-	-	-	-	-	-
Paper and allied products	4,900	2,600	2,300	2,100	1,800	100	-	-	200	200	-
Chemicals and allied products	43,600	11,700	31,900	25,200	22,900	1,600	500	-	200	6,100	600
Industrial chemicals	19,000	7,200	11,800	10,200	8,300	1,500	300	-	100	1,100	500
Plastics and synthetics, except glass	6,400	2,600	3,800	3,800	3,600	100	100	-	-	-	-
Drugs	9,100	300	8,800	3,800	3,700	-	-	-	100	4,900	100
Petroleum refining and related industries	3,300	1,200	2,100	2,000	1,800	100	-	100	-	-	100
Rubber and miscellaneous plastics products	3,600	2,800	800	800	700	-	-	-	100	-	-
Other nondurable goods manufacturing [2]	900	400	500	400	-	-	-	-	100	-	-
Nonmanufacturing, total	74,900	48,200	26,700	18,200	8,100	5,500	800	2,600	1,200	3,000	5,500
Metal, coal, and nonmetallic mining	800	400	400	400	200	-	100	100	-	-	-
Crude petroleum and natural gas extraction	4,400	1,700	2,700	2,400	300	200	-	1,800	100	-	300
Contract construction	4,500	4,100	400	400	100	-	-	300	-	-	-
Transportation and related services	900	500	400	300	100	-	-	-	200	-	100
Communications and related servi es	1,100	700	400	-	-	-	-	-	-	-	400
Electric, gas, and sanitary services	1,500	1,300	200	100	100	-	-	-	-	-	100
Wholesale and retail trade	4,300	2,100	2,200	1,700	1,400	100	200	-	-	300	200
Finance, insurance, and real estate	1,100	100	1,000	-	-	-	-	-	-	200	800
Business services	56,300	37,300	19,000	12,900	5,900	5,200	500	400	900	2,500	3,600
Commercial laboratories	45,500	28,800	16,700	11,500	5,600	4,400	400	300	800	2,200	3,000
Medical and dental laboratories	400	-	400	100	100	-	-	-	-	300	-
Engineering and architectural services	10,400	8,500	1,900	1,300	200	800	100	100	100	-	600
Other nonmanufacturing [3]	-	-	-	-	-	-	-	-	-	-	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 8. Employment of scientists and engineers, in Federal Government work, total, and in research and development by agency and industry, 1969

Industry	All agencies		Department of Defense		National Aeronautics and Space Administration		Other agencies	
	Total	R & D	Total	R & D	Total	R & D	Total	R & D
Total, all industries	281,300	155,000	197,000	105,500	44,500	27,100	39,700	22,400
Manufacturing, total	220,400	116,900	164,200	84,700	35,800	22,900	20,400	9,300
Durable goods manufacturing, total	206,700	110,700	161,100	83,700	35,300	22,900	10,300	4,100
Ordnance and accessories	59,900	36,000	44,200	27,300	14,600	8,500	1,100	200
Stone, clay, and glass products	200	-	-	-	-	-	200	-
Primary metal industries	900	200	700	200	200	-	-	-
Fabricated metal products	3,300	500	1,800	300	500	-	1,000	200
Machinery, except electrical	7,200	3,000	5,600	2,400	600	300	1,000	300
Specialized machinery and equipment	2,000	700	1,400	500	100	-	500	200
Office and computing machines	4,000	1,900	3,300	1,600	300	200	400	100
Electrical machinery	56,900	34,500	45,200	26,300	8,100	6,600	3,600	1,600
Electrical distribution equipment	3,100	1,200	2,400	800	200	100	500	300
Communications equipment	42,300	28,600	34,700	22,400	6,300	5,500	1,300	700
Electronic components and accessories	10,300	4,300	7,000	2,800	1,500	900	1,800	600
Transportation equipment	68,100	30,700	54,900	22,200	10,200	6,900	3,000	1,600
Motor vehicles	400	200	300	200	-	-	100	-
Aircraft and parts	66,600	30,300	53,600	21,800	10,200	6,900	2,800	1,600
Instruments and related products	9,900	5,700	8,500	4,900	1,100	600	300	200
Other durable goods manufacturing [1]	300	100	200	100	-	-	100	-
Nondurable goods manufacturing, total	13,700	6,200	3,100	1,000	500	-	10,100	5,200
Food and kindred products	100	-	-	-	-	-	100	-
Textiles and apparel products	100	-	-	-	-	-	100	-
Paper and allied products	200	-	100	-	100	-	-	-
Chemicals and allied products	12,300	5,900	2,100	700	300	-	9,900	5,200
Industrial chemicals	10,400	5,600	1,000	500	300	-	9,100	5,100
Plastics and synthetics, except glass	200	-	100	-	-	-	100	-
Drugs	500	100	-	-	-	-	500	100
Petroleum refining and related industries	100	-	-	-	100	-	-	-
Rubber and miscellaneous plastics products	900	300	900	300	-	-	-	-
Other nondurable goods manufacturing [2]	-	-	-	-	-	-	-	-
Nonmanufacturing, total	60,900	38,100	32,900	20,800	8,700	4,200	19,300	13,100
Metal, coal, and nonmetallic mining	-	-	-	-	-	-	-	-
Crude petroleum and natural gas extraction	-	-	-	-	-	-	-	-
Contract construction	2,600	500	600	100	200	-	1,800	400
Transportation and related services	400	100	200	100	200	-	-	-
Communications and related services	400	100	400	100	-	-	-	-
Electric, gas, and sanitary services	-	-	-	-	-	-	-	-
Wholesale and retail trade	400	100	100	-	-	-	300	100
Finance, insurance, and real estate	-	-	-	-	-	-	-	-
Business services	57,100	37,300	31,600	20,500	8,300	4,200	17,200	12,600
Commerical laboratories	37,400	31,200	22,800	19,000	4,600	3,700	10,000	8,500
Medical and dental laboratories	100	-	-	-	-	-	100	-
Engineering and architectural services	19,600	6,100	8,800	1,500	3,700	500	7,100	4,100
Other nonmanufacturing [3]								

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 9. Employment of engineers in Federal Government work, total, and in research and development by agency and industry, 1969

Industry	All agencies		Department of Defense		National Aeronautics and Space Administration		Other agencies	
	Total	R & D	Total	R & D	Total	R & D	Total	R & D
Total, all industries	241,800	130,300	176,900	92,600	38,000	23,400	26,900	14,300
Manufacturing, total	195,500	103,500	151,000	77,000	31,300	20,600	13,200	5,900
Durable goods manufacturing, total	188,400	101,000	148,600	76,500	30,900	20,600	8,900	3,900
Ordnance and accessories	51,400	31,600	39,200	24,200	11,400	7,200	800	200
Stone, clay, and glass products	200	-	-	-	-	-	200	-
Primary metal industries	800	200	600	200	200	-	-	-
Fabricated metal products	3,100	500	1,700	300	500	-	900	200
Machinery, except electrical	6,100	2,500	4,800	1,900	400	300	900	300
Specialized machinery and equipment	2,000	700	1,400	500	100	-	500	200
Office and computing machines	2,900	1,400	2,500	1,100	100	200	300	100
Electrical machinery	53,600	32,300	42,800	24,700	7,600	6,100	3,200	1,500
Electrical distribution equipment	2,900	1,200	2,300	700	200	100	400	200
Communications equipment	40,000	26,700	33,000	21,000	5,800	5,000	1,200	700
Electronic components and accessories	9,500	4,200	6,400	2,700	1,500	900	1,600	600
Transportation equipment	63,400	28,400	51,100	20,400	9,700	6,400	2,600	1,600
Motor vehicles	400	200	300	200	-	-	100	-
Aircraft and parts	61,900	28,000	49,800	20,000	9,700	6,400	2,400	1,600
Instruments and related products	9,500	5,400	8,200	4,700	1,100	600	200	100
Other durable goods manufacturing [1]	300	100	200	100	-	-	100	-
Nondurable goods manufacturing, total	7,100	2,500	2,400	500	400	-	4,300	200
Food and kindred products	-	-	-	-	-	-	-	-
Textiles and apparel products	-	-	-	-	-	-	-	-
Paper and allied products	200	-	100	-	100	-	-	-
Chemicals and allied products	5,900	2,200	1,400	200	200	-	4,300	2,000
Industrial chemicals	5,000	2,100	500	100	200	-	4,300	2,000
Plastics and synthetics, except glass	100	-	100	-	-	-	-	-
Drugs	-	-	-	-	-	-	-	-
Petroleum refining and related industries	100	-	-	-	100	-	-	-
Rubber and miscellaneous plastics products	900	300	900	300	-	-	-	-
Other nondurable goods manufacturing [2]	-	-	-	-	-	-	-	-
Nonmanufacturing, total	46,300	26,800	25,900	15,600	6,700	2,800	13,700	8,400
Metal, coal, and nonmetallic mining	-	-	-	-	-	-	-	-
Crude petroleum and natural gas extraction	-	-	-	-	-	-	-	-
Contract construction	2,600	500	600	100	200	-	1,800	400
Transportation and related services	400	100	200	100	200	-	-	-
Communications and related services	400	100	400	100	-	-	-	-
Electric, gas, and sanitary services	-	-	-	-	-	-	-	-
Wholesale and retail trade	400	100	100	-	-	-	300	100
Finance, insurance, and real estate	-	-	-	-	-	-	-	-
Business services	42,500	26,000	24,600	15,300	6,300	2,800	11,600	7,900
Commerical laboratories	26,300	21,800	17,000	14,100	2,700	2,400	6,600	5,300
Medical and dental laboratories	-	-	-	-	-	-	-	-
Engineering and architectural services	16,200	4,200	7,600	1,200	3,600	400	500	2,600
Other nonmanufacturing [3]	-	-	-	-	-	-	-	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detailed may not add to toals due to rounding.

Table 10. Employment of scientists in Federal Government work, total, and in research and development by agency and industry, 1969

Industry	All agencies		Department of Defense		National Aeronautics and Space Administration		Other agencies	
	Total	R & D	Total	R & D	Total	R & D	Total	R & D
Total, all industries	39,500	24,700	20,200	12,900	6,500	3,700	12,800	8,100
Manufacturing, total	24,900	13,400	13,200	7,700	4,500	2,300	7,200	3,400
Durable goods manufacturing, total	18,300	9,700	12,500	7,200	4,400	2,300	1,400	200
Ordnance and accessories	8,500	4,400	5,000	3,100	3,200	1,300	300	-
Stone, clay, and glass products	-	-	-	-	-	-	-	-
Primary metal industries	100	-	100	-	-	-	-	-
Fabricated metal products	200	-	100	-	-	-	100	-
Machinery, except electrical	1,100	500	800	500	200	-	100	-
Specialized machinery and equipment	-	-	-	-	-	-	-	-
Office and computing machines	1,100	500	800	500	200	-	100	-
Electrical machinery	3,300	2,200	2,400	1,600	500	500	400	100
Electrical distribution equipment	200	200	100	100	-	-	100	100
Communications equipment	2,300	1,900	1,700	1,400	500	500	100	-
Electronic components and accessories	800	100	600	100	-	-	200	-
Transportation equipment	4,700	2,300	3,800	1,800	500	500	400	-
Motor vehicles	-	-	-	-	-	-	-	-
Aircraft and parts	4,700	2,300	3,800	1,800	500	500	400	-
Instruments and related products	400	300	300	200	-	-	100	100
Other durable goods manufacturing [1]	-	-	-	-	-	-	-	-
Nondurable goods manufacturing, total	6,600	3,700	700	500	100	-	5,800	3,200
Food and kindred products	100	-	-	-	-	-	100	-
Textiles and apparel products	100	-	-	-	-	-	100	-
Paper and allied products	-	-	-	-	-	-	-	-
Chemicals and allied products	6,400	3,700	700	500	100	-	5,600	3,200
Industrial chemicals	5,400	3,500	500	400	100	-	4,800	3,100
Plastics and synthetics, except glass	100	-	-	-	-	-	100	-
Drugs	500	100	-	-	-	-	500	100
Petroleum refining and related industries	-	-	-	-	-	-	-	-
Rubber and miscellaneous plastics products	-	-	-	-	-	-	-	-
Other nondurable goods manufacturing [2]	-	-	-	-	-	-	-	-
Nonmanufacturing, total	14,600	11,300	7,000	5,200	2,000	1,400	5,600	4,700
Metal, coal, and nonmetallic mining	-	-	-	-	-	-	-	-
Crude petroleum and natural gas extraction	-	-	-	-	-	-	-	-
Contract construction	-	-	-	-	-	-	-	-
Transportation and related services	-	-	-	-	-	-	-	-
Communications and related services	-	-	-	-	-	-	-	-
Electric, gas, and sanitary services	-	-	-	-	-	-	-	-
Wholesale and retail trade	-	-	-	-	-	-	-	-
Finance, insurance, and real estate	-	-	-	-	-	-	-	-
Business services	14,600	11,300	7,000	5,200	2,000	1,400	5,600	4,700
Commerical laboratories	11,100	9,400	5,800	4,900	1,900	1,300	3,400	3,200
Medical and dental laboratories	100	-	-	-	-	-	100	-
Engineering and architectural services	3,400	1,900	1,200	300	100	100	2,100	1,500
Other nonmanufacturing [3]	-	-	-	-	-	-	-	-

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

Table 11. Employment of scientists and engineers in Federal Government work, total, and in research and development, all agencies by industry, 1968

Industry	Scientists and engineers		Engineers		Scientists	
	Total	R & D	Total	R & D	Total	R & D
Total, all industries	273,400	151,500	235,700	127,700	37,700	23,800
Manufacturing	218,600	117,100	194,100	103,500	24,500	13,600
Durable goods manufacturing, total	205,300	111,200	187,300	101,100	18,000	10,100
Ordnance and accessories	59,300	36,400	50,900	31,900	8,400	4,500
Stone, clay, and glass products	200	-	200	-	-	-
Primary metal industries	800	200	700	200	100	-
Fabricated metal products	3,000	400	2,800	400	200	-
Machinery, except electrical	6,500	2,700	5,500	2,200	1,000	500
Specialized machinery and equipment	1,700	600	1,700	600	-	-
Office and computing machines	3,600	1,700	2,600	1,200	1,000	500
Electrical machinery	57,500	34,900	54,100	32,600	3,400	2,300
Electrical distribution equipment	2,900	1,100	2,700	1,100	200	-
Communications equipment	42,900	28,900	40,500	26,900	2,400	2,000
Electronic components and accessories	10,500	4,500	9,700	4,300	800	200
Transportation equipment	68,500	31,100	64,000	28,600	4,500	2,500
Motor vehicles	300	200	300	200	-	-
Aircraft and parts	67,200	30,800	62,700	28,300	4,500	2,500
Instruments and related products	9,200	5,500	8,800	5,200	400	300
Other durable goods manufacturing [1]	300	100	300	100	-	-
Nondurable goods manufacturing, total	13,300	5,900	6,800	2,400	6,500	3,500
Food and kindred products	100	-	-	-	100	-
Textiles and apparel products	100	-	-	-	100	-
Paper and allied products	200	-	200	-	-	-
Chemicals and allied products	12,000	5,600	5,800	2,100	6,200	3,500
Industrial chemicals	10,400	5,300	4,900	2,000	5,500	3,300
Plastics and synthetics, except glass	200	-	100	-	100	-
Drugs	300	100	-	-	300	100
Petroleum refining and related industries	100	-	-	-	100	-
Rubber and miscellaneous plastics products	800	300	800	300	-	-
Other nondurable goods manufacturing [2]	-	-	-	-	-	-
Nonmanufacturing, total	54,800	34,400	41,600	24,200	13,200	10,200
Metal, coal, and nonmetallic mining	-	-	-	-	-	-
Crude petroleum and natural gas extraction	-	-	-	-	-	-
Contract construction	2,200	400	2,200	400	-	-
Transportation and related services	300	100	300	100	-	-
Communications and related services	300	100	300	100	-	-
Electric, gas, and sanitary services	-	-	-	-	-	-
Wholesale and retail trade	400	100	400	100	-	-
Finance, insurance, and real estate	-	-	-	-	-	-
Business services	51,600	33,700	38,400	23,500	13,200	10,200
Commercial laboratories	34,200	28,200	24,100	19,700	10,100	8,500
Medical and dental laboratories	100	-	-	-	100	-
Engineering and architectural services	17,300	5,600	14,300	3,800	3,000	1,700
Other nonmanufacturing [3]						

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Details may not add to totals due to rounding.

Table 12. Employment of scientists and engineers in industry, and in research and development work within industry, distributed by State, 1969

Industry	Scientists and engineers		Engineers		Scientists	
	Total	In R & D	Total	In R & D	Total	In R & D
All States	1,062,500	389,600	849,000	289,900	213,500	99,700
Massachusetts	39,300	18,900	30,900	13,800	8,400	5,100
Connecticut	34,200	17,200	29,100	13,900	5,100	3,300
New York	120,600	48,100	97,200	36,200	23,400	11,900
New Jersey	55,700	25,600	38,200	14,300	17,500	11,300
Pensylvania	61,300	21,000	44,300	12,900	17,000	8,100
Ohio	60,000	19,900	49,000	14,600	11,000	5,300
Indiana	28,400	9,700	21,900	7,500	6,500	2,200
Illinois	57,200	17,900	47,500	12,400	9,700	5,500
Michigan	55,400	20,800	45,900	15,700	9,500	5,100
Wisconsin	15,700	4,900	13,400	4,100	2,300	800
Minnesota	16,800	5,200	13,000	3,500	3,800	1,700
Iowa	7,800	2,300	6,400	1,700	1,400	500
Missouri	28,000	5,900	22,800	3,500	5,200	2,400
Kansas	9,000	2,300	7,500	1,900	1,500	400
Delaware	7,100	2,000	4,500	800	2,600	1,200
Maryland	17,400	7,500	13,700	5,800	3,700	1,700
Virginia	15,100	4,700	11,400	2,700	3,700	2,000
West Virginia	8,600	2,100	6,500	1,200	2,100	900
North Carolina	13,400	3,900	10,100	2,600	3,300	1,300
South Carolina	7,100	1,500	5,500	900	1,600	600
Georgia	12,000	2,900	10,600	2,500	1,400	400
Florida	22,900	4,200	19,900	3,400	3,000	800
Kentucky	7,200	1,400	5,700	1,000	1,500	400
Tennessee	15,600	7,300	10,300	4,100	5,300	3,200
Alabama	14,600	5,100	11,300	4,000	3,300	1,100
Louisiana	15,700	3,400	12,600	2,500	3,100	900
Oklahoma	9,100	1,600	7,100	1,000	2,000	600
Texas	58,600	16,500	45,900	12,800	12,700	3,700
Colorado	9,600	3,300	7,700	2,500	1,900	800
Arizona	6,200	1,600	5,100	1,400	1,100	200
Washington	20,400	9,100	16,300	6,700	4,100	2,400
California	155,600	54,900	133,300	43,700	22,300	11,200
All other States	56,900	36,900	44,400	34,300	12,500	2,600

NOTE: Details may not add to totals due to rounding.

Table 13. Employment of scientists and engineers, and technicians, and percent receiving in-house training in science and technology by industry, 1969

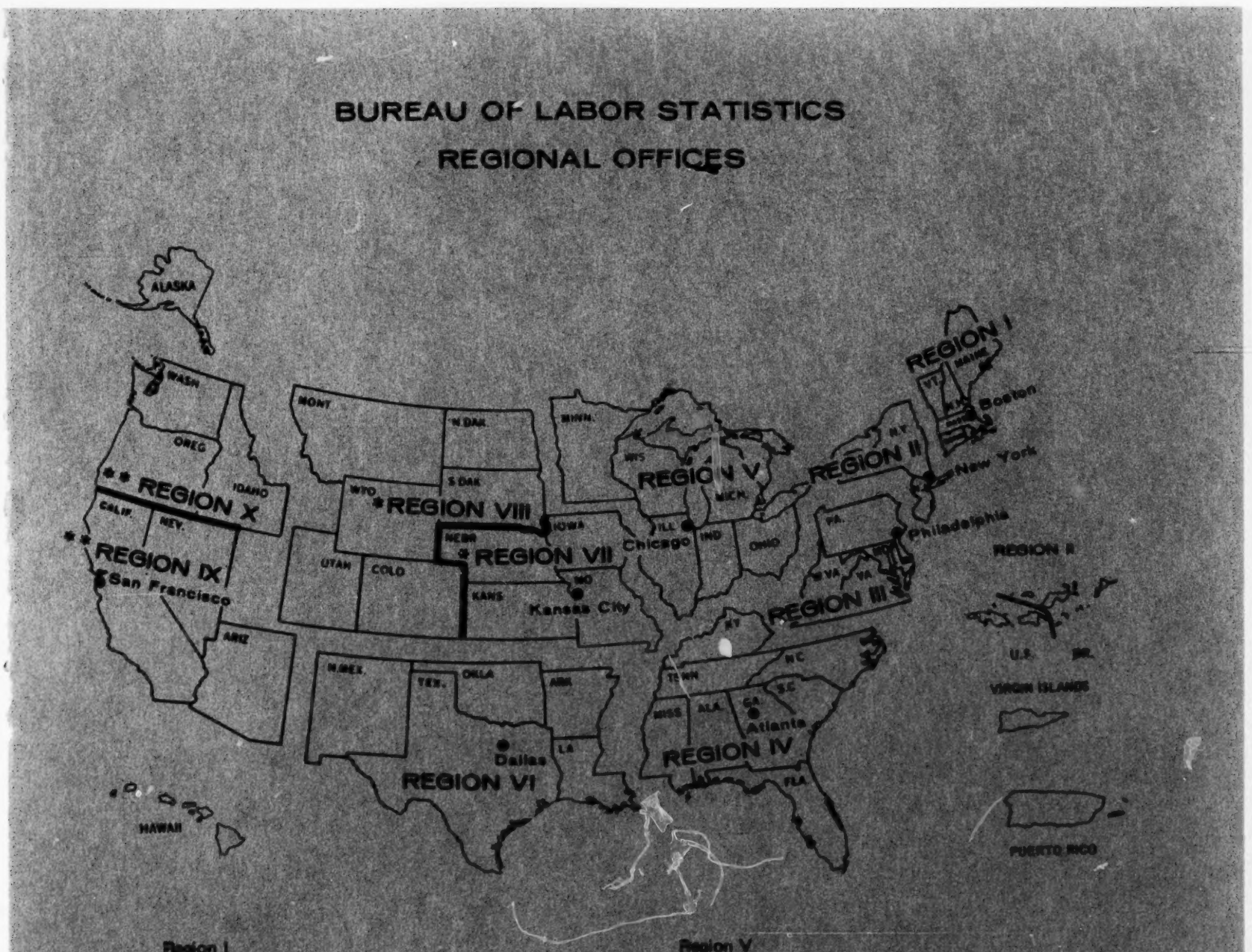
Industry	Scientists and engineers		Technicians	
	Total	Percent receiving in-house training	Total	Percent receiving in-house training
Total, all industries	1,062,500	46.0	772,500	47.8
Manufacturing	735,700	40.4	421,900	44.6
Durable goods manufacturing, total	567,400	37.4	346,100	42.9
Ordnance and accessories	63,000	.8	20,100	16.4
Stone, clay, and glass products	12,100	61.5	7,000	63.3
Primary metal industries	32,100	56.1	19,700	52.7
Fabricated metal products	31,200	62.8	25,400	66.0
Machinery, except electrical	89,800	51.5	76,300	50.7
Specialized machinery and equipment	50,100	65.9	41,300	68.8
Office and computing machines	26,300	22.8	24,800	17.2
Electrical machinery	160,600	38.0	106,400	37.6
Electrical distribution equipment	32,600	39.3	23,100	39.3
Communications equipment	78,600	32.2	45,200	29.0
Electronic components and accessories	28,200	43.5	23,400	41.7
Transportation equipment	135,900	24.2	61,800	28.0
Motor vehicles	32,400	11.9	16,600	15.8
Aircraft and parts	98,100	28.3	37,600	31.3
Instruments and related products	35,800	34.8	23,300	51.1
Other durable goods manufacturing [1]	6,900	59.4	6,100	61.9
Nondurable goods manufacturing, total	168,300	49.8	75,800	52.3
Food and kindred products	14,700	75.7	5,900	74.4
Textiles and apparel products	5,800	81.8	2,900	85.3
Paper and allied products	14,700	66.6	6,800	62.4
Chemicals and allied products	103,500	39.8	45,400	42.7
Industrial chemicals	44,900	29.5	19,800	35.4
Plastics and synthetics, except glass	18,900	26.5	8,900	28.2
Drugs	17,100	49.3	6,000	63.5
Petroleum refining and related industries	12,700	33.7	6,900	38.1
Rubber and miscellaneous plastics products	14,400	77.2	5,900	75.1
Other nondurable goods manufacturing [2]	2,500	89.6	2,000	69.6
Nonmanufacturing, total	326,800	57.5	350,600	51.2
Metal, coal, and nonmetallic mining	7,600	65.6	4,400	67.6
Crude petroleum and natural gas extraction	25,800	44.3	9,300	42.6
Contract construction	47,700	75.1	31,500	55.7
Transportation and related services	9,000	67.7	8,000	50.1
Communications and related services	19,100	25.9	38,600	34.7
Electric, gas, and sanitary services	28,300	68.0	23,500	56.6
Wholesale and retail trade	29,200	46.7	39,700	38.5
Finance, insurance, and real estate	9,800	62.5	6,300	53.8
Business services	149,600	56.6	188,500	55.9
Commercial laboratories	73,000	42.7	50,700	43.3
Medical and dental laboratories	1,800	44.4	22,500	37.5
Engineering and architectural services	74,300	70.1	114,900	65.3
Other nonmanufacturing [3]	700	53.6	800	52.4

[1] Includes lumber, wood products, and furniture; and other miscellaneous manufacturing industries.
[2] Includes tobacco manufactures; printing and publishing; and leather and finished leather products.
[3] Includes agricultural services, forestry, and fisheries.

NOTE: Detail may not add to totals due to rounding.

* U. S. GOVERNMENT PRINTING OFFICE : 1972 O - 484-788 (53)

BUREAU OF LABOR STATISTICS
REGIONAL OFFICES



Region I
1603-JFK Federal Building
Government Center
Boston, Mass. 02203
Phone: 223-6762 (Area Code 617

Region II
341 Ninth Ave., Rm. 1025
New York, N.Y. 10001
Phone: 971-5405 (Area Code 212)

Region III
406 Penn Square Building
1317 Filbert St.
Philadelphia, Pa. 19107
Phone: 597-7796 (Area Code 215)

Region IV
Suite 540
1371 Peachtree St. NE.
Atlanta, Ga. 30309
Phone: 526-5418 (Area Code 404)

Region V
8th Floor, 300 South Wacker Drive
Chicago, Ill. 60606
Phone: 353-1880 (Area Code 312)

Region VI
1100 Commerce St., Rm. 687
Dallas, Tex. 75202
Phone: 749-3516 (Area Code 214)

Regions VII and VIII
Federal Office Building
911 Walnut St., 10th Floor
Kansas City, Mo. 64106
Phone: 374-2481 (Area Code 816)

Regions IX and X
450 Golden Gate Ave.
Box 36017
San Francisco, Calif. 94102
Phone: 556-4678 (Area Code 415)

* Regions VII and VIII will be serviced by Kansas City.
** Regions IX and X will be serviced by San Francisco.

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

THIRD CLASS MAIL

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF LABOR